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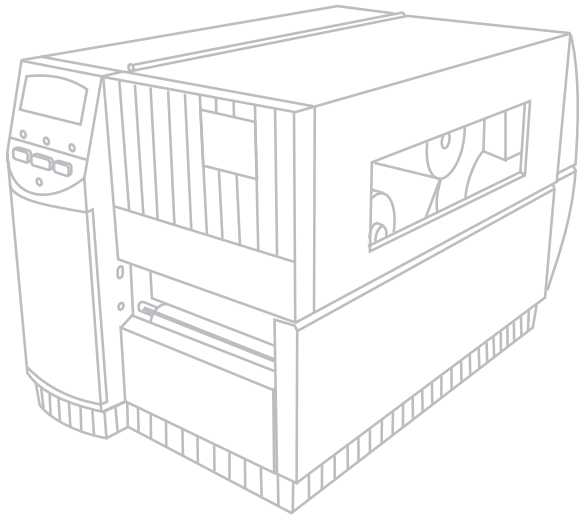
Z Series™

User's Guide

For the Zebra *Z*4000™ and *Z*6000™ Printers



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NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced Radio/TV technician for help.

NOTE: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance.

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DECLARATION OF CONFORMITY

I have determined that the Zebra printers identified as the

Z Series™ *Z*4000™
&
Z Series™ *Z*6000™

manufactured by:

Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109, USA

have been shown to comply with the applicable technical standards of the FCC

for Home, Office, Commercial and Industrial use

if no unauthorized change is made in the equipment
and if the equipment is properly maintained and operated.

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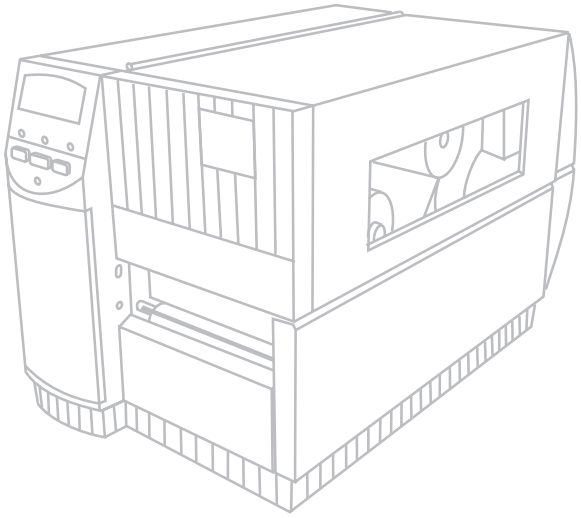

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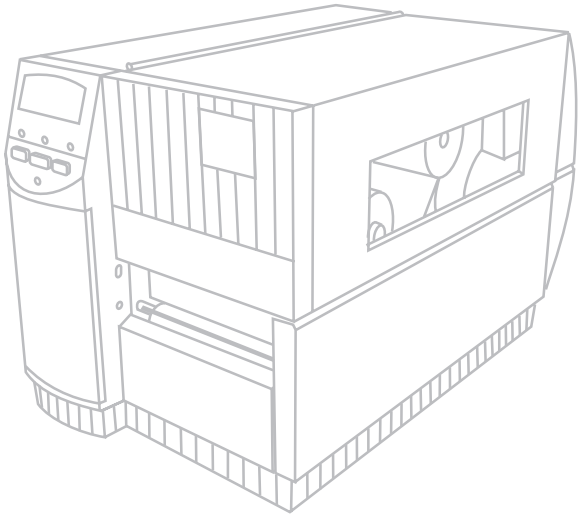

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Welcome

Congratulations! You have just purchased a high-quality thermal demand printer manufactured by the industry leader in quality, service, and value. For over 25 years, Zebra Technologies Corporation has provided customers with the highest caliber of products and support.

This user's guide provides all the information you will need to operate the printer on a daily basis.

To create and print label formats, refer to the *ZPL II Programming Guide* (part # 46469L). This guide is available by contacting your distributor or Zebra Technologies Corporation.

In addition, label preparation software is available. Contact your distributor or Zebra Technologies Corporation for further information.

The *Z Series™ Maintenance Manual* (part # 77450L) contains the information you may need to properly maintain your printer.

Getting Started

Unpacking

Save the carton and all packing materials in case shipping is required.

Inspect the printer for possible shipping damage:

- Check all exterior surfaces for damage.
- Raise the Media Access Door and inspect the Media Compartment for damage.

Reporting Damage

If you discover shipping damage:

- Immediately notify the shipping company and file a damage report.
- Retain the carton and all packing material for inspection.
- Notify your local Zebra distributor of the damage.

Zebra Technologies Corporation is not responsible for any damage incurred during shipment of the printer and will not cover the repair of this damage under its warranty policy. Any damage claim should be filed with the shipping company.

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For shipping information, refer to Appendix C.

Communications

Refer to Figure 1. The *Z* Series™ printer comes standard with both an Electronics Industries Association (EIA) RS-232 serial data interface(a) and a bi-directional parallel interface(b) compliant with the IEEE1284 standard. The serial interface is also configured for both RS-422/ RS-485 single drop and RS-485 multi-drop communication modes.

NOTE: *You must supply the interface cable for your application. See Appendix B of this manual for specific cable requirements.*

Printer Power

The Power Supply in the *Z* Series™ printer automatically detects the applied line voltage and works in the 90 to 265 VAC range.

Refer to Figure 1. The AC Power Cord must have a three-prong female connector on one end which plugs into the mating connector(c) at the rear of the printer. If a power cable was not included with your printer, refer to Appendix C at the back of this guide.

WARNING!! For personnel and equipment safety, always use a three-prong plug with an earth ground connection to the AC Power Source.

Refer to Figure 1. Insure that the AC Power ON/OFF Switch(d) is in the OFF (O) position before connecting the AC Power cord to a nearby electrical outlet.

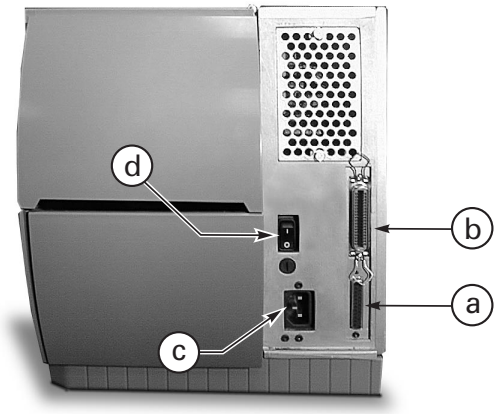

Figure 1. Printer Rear View

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Printer Configuration

Z Series™ Configuration

The *Z* Series™ printer will have one of two different styled front panels. The deluxe front panel contains an LCD (Liquid Crystal Display), but the standard front panel does not. With the deluxe front panel, the LCD displays the parameters during the configuration process. For those printers with the standard front panel, two banks of eight miniature switches located inside the printer's front panel access door are used when configuring the printer.

Communications Parameters

The *Z* Series™ printer is equipped with both serial data and parallel data communication interfaces. This permits two sources to send label formats to the printer.

The first source to send a "Start of Label Format" command controls the printer. The printer will send a "printer busy" command to the second source to inhibit data transmission.

The serial interface is factory preset to match the typical PC environment with RS232 communication:

9600 Baud, 8 Data Bits,
No Parity, Xon/Xoff Handshaking.

If you need to change your printer's serial communications settings to match those of your host computer, refer to Appendix A. If you do not know the settings of your host computer, refer to the instruction manual provided with the computer or your software application.

See Appendix B of this guide for specific data communication cable requirements.

The printer automatically senses if a parallel communications cable is connected from your host computer.

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Operating Modes

When shipped from the factory, the printer is preset to the most commonly used modes of operation:

Tear-Off Mode, Thermal Transfer Printing,
Die-Cut Media, Serial Port RS-232 Communications.

Refer to Appendix A to configure the parameters for the following:

- Options, such as Power Rewind/Power Peel, Value Peel, or Cutter
- Operating Modes
- Print Darkness
- Label Tear-Off/Cut-Off Position
- Image Position on the label

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Media & Ribbon Loading

Loading Media

To load media, refer to Figure 2.

1. Raise the media cover.
2. Press the Printhead Open Lever(e).
   [The Printhead Assembly(f) automatically springs up.]
3. Fold down the Media Supply Guide(g) and slide it out as far from the printer frame as possible.
4. Slide the Media Guide(h) out as far from the printer frame as possible.
5. Determine the type of media required for your application and follow the roll media or fanfold media loading procedure.

NOTE: *If your printer has either the Power Rewind/Power Peel, Value Peel, or Cutter option installed, refer to the Options section for media loading instructions.*

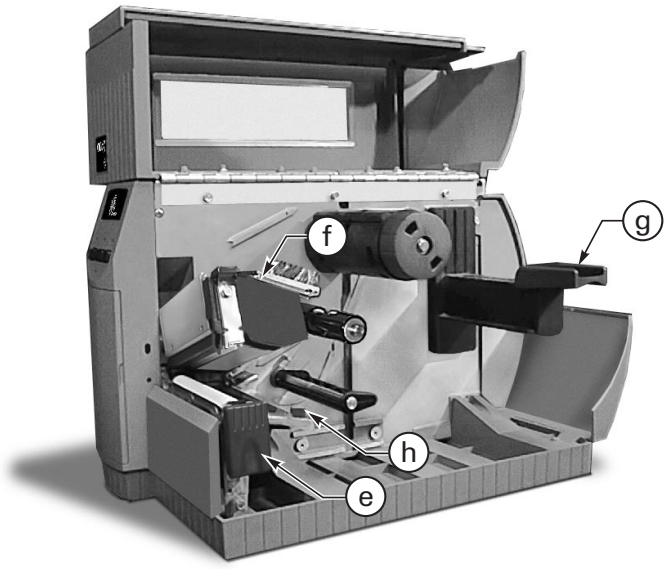

Figure 2. Loading Media

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Roll Media Loading

To load roll media, refer to Figure 3.

1. Place the roll of media on the Media Supply Hanger(i) and push it on all the way.
2. Fold the Media Supply Guide(g) up and slide it against the outer edge of the media roll.
3. Feed the media under the Media Spindle(j), under the Ribbon Sensor(k), and out the front of the printer.
4. Slide the Media Guide(h) in until it is against the outer edge of the media.
5. Close the Printhead Assembly and the Media Cover, or continue to "Loading Ribbon".

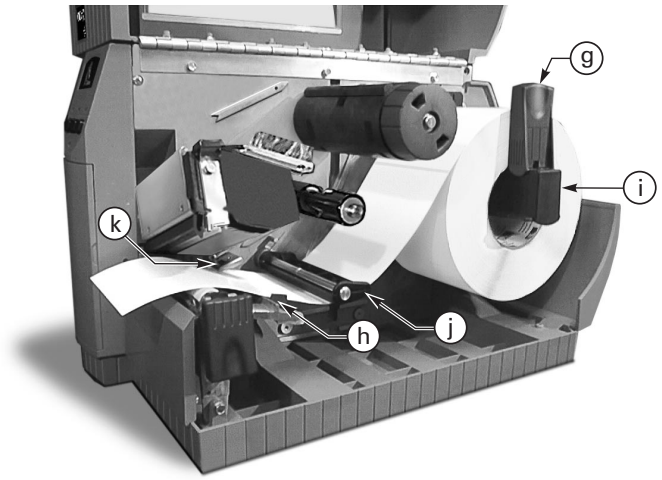

Figure 3. Roll Media Loading

Fanfold Media Loading

To load fanfold media, place the media behind the printer and refer to Figure 4.

1. Pass the fanfold media over the Media Supply Hanger(i).
2. Fold the Media Supply Guide(g) up and slide it against the outer edge of the media.
3. Feed the media under the Media Spindle(j), under the Ribbon Sensor(k), and out the front of the printer.
4. Slide the Media Guide(h) against the outer edge of the media.
5. Close the Printhead Assembly and the Media Cover, or continue to "Loading Ribbon".

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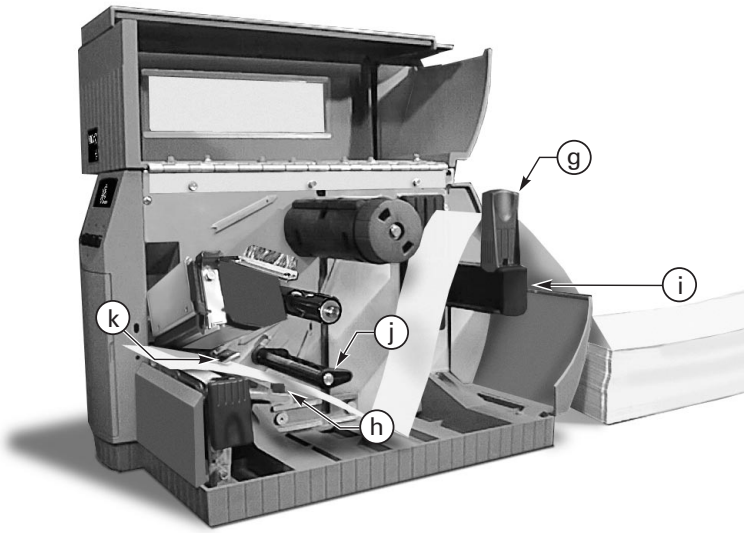

Figure 4. Fanfold Media Loading

Loading Ribbon

NOTE: *The Ribbon Supply Spindle in your printer may be a "Dual-Tension" variety. Most applications require the spindle to be in the "Normal" position. The "Low-Tension" position is recommended only when wide ribbons are used and normal tension hampers the ribbon movement.*

To place this spindle in the "Normal" position, firmly pull out on the Spindle End-Cap until it clicks into place as shown in Figure 5a. To place the spindle in the "Low-Tension" position, firmly push in on the Spindle End-Cap until it clicks into place.

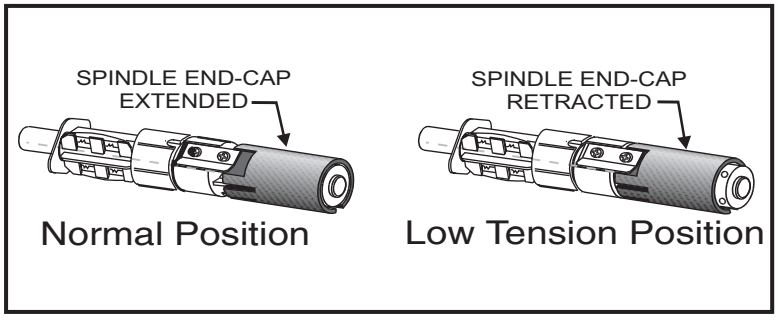

Figure 5a. Ribbon Supply Spindle Positioning

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Loading the Ribbon

CAUTION: Always use ribbon that is wider than the media. The smooth backing of the ribbon protects the printhead from wear. (For Direct Thermal printing, do not load ribbon in the printer.)

To load ribbon, refer to Figures 5a and 5b.

1. Place the roll on the Ribbon Supply Spindle(l) and push it on all the way.
2. Pull the end of the ribbon over the Ribbon Sensor(k), under the Printhead assembly(f), and up over the Ribbon Guide Plate(m).
3. Wind the ribbon onto the Take-up Spindle(n) for several turns in a clockwise direction.
4. As you close the Printhead Assembly, keep the ribbon snug and free of wrinkles, and in line with the guide mark near the left edge of the Ribbon Guide Plate.

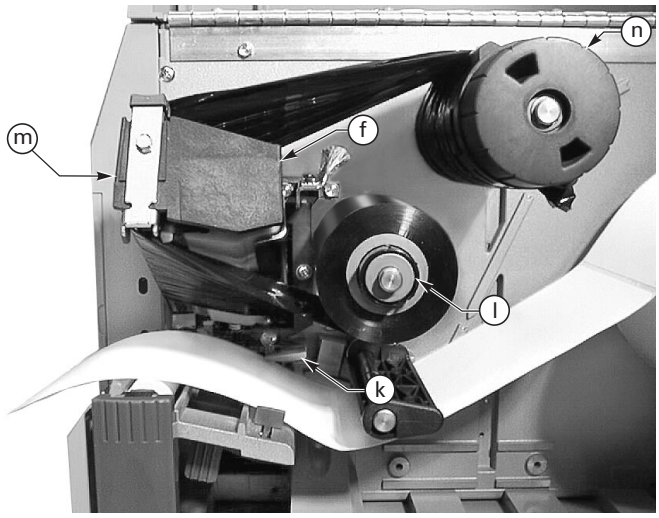

Figure 5b. Ribbon Loading

Removing Ribbon

To remove the ribbon, turn the Release Knob on the end of the Take-up Spindle(n) counterclockwise and slide the ribbon off the Spindle.

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Media Sensor Positioning

Media Sensor Operation

When the printer is turned ON, a Power ON Self Test is performed which checks the status of the electronic system and controls within the printer. Additional operating parameters are determined by the type of media being used and the position of the Media Sensor located behind the Platen and under the media.

Non-Continuous (Labels, Notched Tags) Media

This type of media has some type of physical characteristic (notch, black mark, gap between die-cut labels, etc.) which indicates the start-of-label position. The Media Sensor must be properly positioned to sense these indicators.

Continuous Media

Continuous media typically does not contain start-of-label indicators. Label length must be specified by commands sent to the printer.

If you are using ZPL II, include a Label Length (^LL) command in each label format you send to the printer (refer to your ZPL II Programming Guide). If you are using other software to drive your printer, refer to the instructions provided with that software.

Media Sensor Position

1. To properly position the Media Sensor(o), refer to Figure 6.
2. With the Printhead Assembly open, turn the AC Power ON
3. Look through the side of the print mechanism and locate the Media Sensor Positioning Lever(p).
4. (**non-continuous media** - labels, notched tags) Move the lever across the width of the media to position the sensor in line with the start-of-label indicator (notch, black mark, gap between die-cut labels, etc). The glow of the red LED through the media can help to accurately position the sensor.

   (**continuous media** - no notch or opening to sense) Position the

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sensor anywhere under the media so that an “Out-of-Media” condition will still be sensed.

5. Insure the media and ribbon are properly positioned within the print mechanism. then close the Printhead Assembly.
6. Close the printer’s media cover, then turn the printer power OFF.

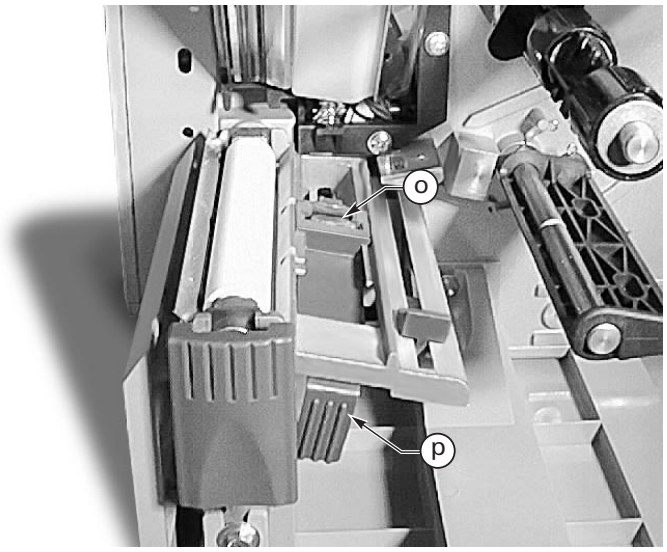

Figure 6. Sensor Positioning

Printer Operational Check

1. To insure proper setup and to check the initial printer configuration, press and hold the CANCEL key while turning the printer power ON. (*Release the CANCEL key once the front panel indicators begin to turn OFF.*)
2. After an initial time period when the Power ON Self Test is performed, the printer will feed out media while calibrating the label length, then print a configuration label.
3. Check the current configuration printed on the label and note any parameters which must be changed to insure the printer fits your application. For information on changing the configuration for your specific application, refer to Appendix A.

A visual check of the label also provides an indication of the print quality. Media width and media thickness vary from one application to the

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next. To maintain proper print quality, refer to the Care & Adjustments section later in this guide.

Figure 7 illustrates a properly loaded *Z* Series™ printer. For loading media and ribbon in printers with the Power Rewind/Power Peel, Value Peel or Cutter options, see the Options section later in this guide.

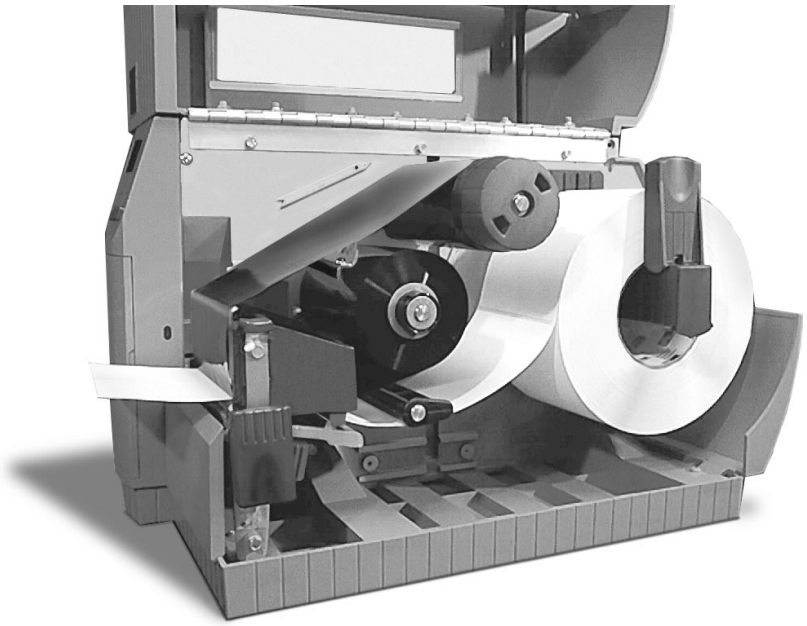

Figure 7. Printer Ready for Operation

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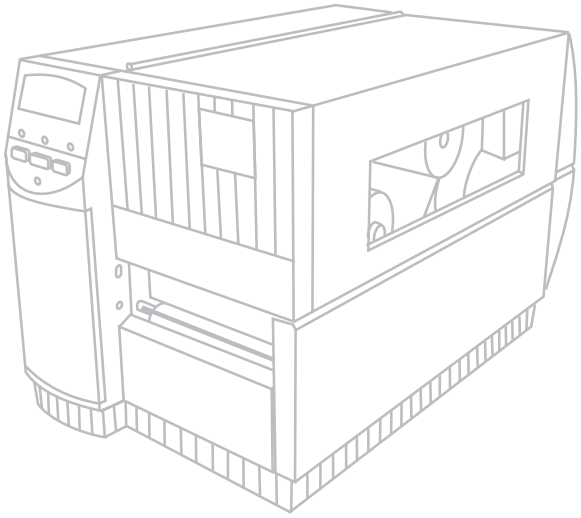

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Printer Operation

Operator Interface

The *Z* Series™ family of printers features either a standard or deluxe front panel. The deluxe front panel features a Liquid Crystal Display (LCD) that provides both printer status information and configuration option menus. This section of the user's guide presents information which is common to both printer front panels. Refer to Figures 8 and 9 to locate the keys and LEDs discussed in this section.

Front Panel Keys

Feed Key

The FEED key forces the printer to feed one blank label. If you press the FEED key while the printer is idle or paused, a blank label is fed immediately. If you press the FEED key while the printer is printing, one blank label is fed after the completion of the current batch of labels. Once the blank label has been fed, pressing the FEED key again will feed a second label.

Pause Key

The PAUSE key stops and restarts the printing process. The first time you press the PAUSE key, any partially printed label is completed; then the printing process is stopped. If the printer is idle when you press the PAUSE key, no new print requests are accepted. Press the PAUSE key a second time to resume the printing process.

Cancel Key

The CANCEL key only functions when the printer is paused. When you press the CANCEL key, the label format that is currently printing is canceled. If no label format is printing, then the next one to be printed is canceled. If there are no label formats stored in the printer and waiting to be printed, the CANCEL key is ignored.

If you press the CANCEL key for an extended period of time (more than 3 seconds) the printer performs a "cancel all formats" operation. The printer discards all of the label format data it has received, and returns to the idle state.

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Front Panel LEDs

LEDs on the front panel are a quick indication of the printer's status. The LEDs listed below are common to all Z Series™ *printers* .

POWER LED

The POWER LED is always ON when the printer is turned ON.

DATA LED

The DATA LED is normally OFF. When data is received, the LED acts as follows:

- SLOW BLINK - Printer is unable to accept more data from the host
- FAST BLINK - Printer is receiving data
- LED ON - No data being received - data processing or printing still occurring.

The DATA LED will also blink once when the CANCEL key is pressed and a format is successfully canceled.

ERROR LED

The ERROR LED is normally OFF. When an error occurs that causes an interruption in the printing process, the LED acts as follows:

- SLOW BLINK - Ribbon In Warning, Under Temp Warning, or Over Temp Error
- FAST BLINK - Printhead Open
- LED ON - Media Out, Ribbon Out, or Cutter Errors

With the Deluxe Front Panel, the type of error will also be visible on the Liquid Crystal Display.

PAUSE LED

The PAUSE LED is normally OFF. When the LED is ON it indicates the printer has stopped all printing operations. If the printer is printing when a PAUSE condition is requested, the LED turns ON at the end of the current label.

In the Peel operating mode, the PAUSE LED will blink when the label is available for removal. No printing occurs when the printer is in the Peel mode of operation and the Peel option is not installed.

Additional Front Panel Controls

The front panel door conceals the configuration and setup keys and/or switches inside. Refer to the Printer Configuration section of this guide to configure the printer for your application.

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Figure 8. Standard Front Panel

Figure 9. Deluxe Front Panel

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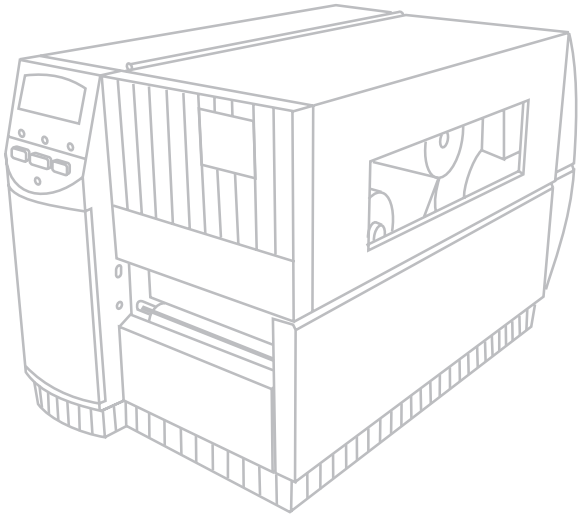

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Media Calibration

Auto-Calibration

The auto-calibration of the *Z* Series™ printer occurs at power ON and each time the printer recovers from error conditions such as media errors, ribbon errors, and printhead open errors. In the process of clearing an error, open and close the printhead then take the printer out of PAUSE. The printer will begin the auto-calibration process if all errors have been cleared.

The printer automatically determines the label length, and media and ribbon sensor settings.

When non-continuous media is sensed, the calibration process is followed by the label length calculation. Once the label length is determined, the media feeds to the rest position and stops.

The results of this calibration are stored in the printer's memory and are retained even if printer power is removed. These parameters remain in effect until the next calibration is performed.

Calibration Control

The auto-calibration process will not take place if the ZPL command or the deluxe front panel setting for “Media Power Up” or “Head Close” is set to either “feed” or “no motion.” In these cases, the printer assumes the media is correctly positioned and starts printing without calibrating.

As long as the printhead is closed, a calibration may be performed. Calibration may clear error conditions that prevent media movement. Ribbon and media error conditions are cleared by calibration, unless an out-of-ribbon or out-of-media condition exists.

NOTE: *If your printer has the standard front panel, the Calibration function is controlled by a ZPL II command sent from the host computer. No front panel calibration control is available.*

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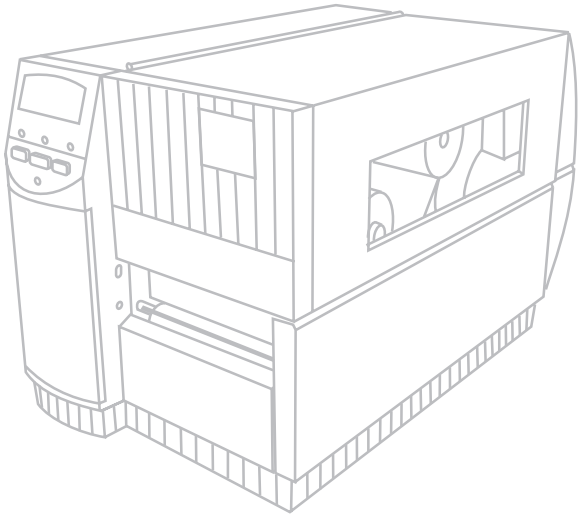

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Care & Adjustments

Cleaning

CAUTION: Use only the cleaning agents indicated. Zebra Technologies Corporation will not be responsible for damage caused by any other cleaning materials used on the Z Series™ printer.

Table 1 provides a recommended cleaning schedule. Cleaning Swabs saturated with 70% Isopropyl Alcohol are available from your Zebra distributor as a Preventive Maintenance Kit (part # 01429).

AREA		METHOD	INTERVAL
See Figure 10 for parts callouts.			After every roll of media (or 500 feet of fanfold media) when printing in the direct thermal mode. After every roll of ribbon when printing in the thermal transfer mode.
Printhead (q)		Alcohol	
Platen Roller (r)		Alcohol	
Media Sensor (o)		Air Blow	
Media Path (See Figure 3 or 4)		Alcohol	
Ribbon Sensor (k)		Air Blow	
Ribbon Path (See Figure 5)		Alcohol	
Cutter Assembly	Dust build-up	Air Blow	After every two to three rolls of media.
	Adhesive build-up	Citrus-Based Cleaner such as Goo-Gone®	After every roll of media or more often depending upon your application and the type of media being cut.
Tear-Off/Peel-Off Bar		Alcohol	Once per month.
Peel Blade		Alcohol	After every roll of media or more often depending upon your application and media.
Label Available Sensor (z) (See Fig. 17)		Air Blow	Once per six months.

Table 1. Recommended Cleaning Schedule

Cleaning the Exterior

The exterior of the *Z* Series™ printer may be cleaned with a lint-free cloth. Do not use harsh, abrasive cleaning agents or solvents. If necessary, a mild detergent or desktop cleaner may be used sparingly.

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Cleaning the Interior

Remove any accumulated dirt and lint from the interior of the printer using a soft bristle brush and/or vacuum cleaner.

Cleaning the Printhead and Platen Roller

Inconsistent print quality, such as voids in the bar code or graphics, may indicate a dirty printhead. For best results, perform the following cleaning procedure after every roll of ribbon.

NOTE: *The printer can remain ON while you are cleaning the printhead. In this way all label formats, images, and all temporary parameter settings stored in the printer's internal memory will be saved.*

To clean the printhead, refer to Figure 10 and follow these steps:

1. Open the Media Compartment Door.
2. Open the Printhead Assembly by pressing the Printhead Open Lever(e).
3. Remove the media and ribbon (if present).
4. Raise the Printhead Assembly by hand and, using a cleaning swab soaked in alcohol, wipe along the printhead(q) print elements from end to end. (The print elements are located within the brown strip just behind the chrome strip on the printhead.) Allow a few seconds for the solvent to evaporate.
5. Rotate the platen roller(r) and clean thoroughly with a cleaning swab soaked in alcohol.
6. Brush/vacuum any accumulated paper lint and dust away from the media and ribbon paths.
7. Reload media and ribbon, close the printhead assembly, close the Media Compartment Door, and continue printing.

Cleaning the Sensors

Refer to Figure 10. The Media Sensor(o) and Ribbon Sensor(k) should be cleaned on a regular basis to ensure proper operation of the printer. For printers with the Value Peel option or the Power Rewind/Power Peel option installed refer to Figure 17 and clean the Label Available Sensor(z). Brush or vacuum any accumulated paper lint and dust away from the sensors.

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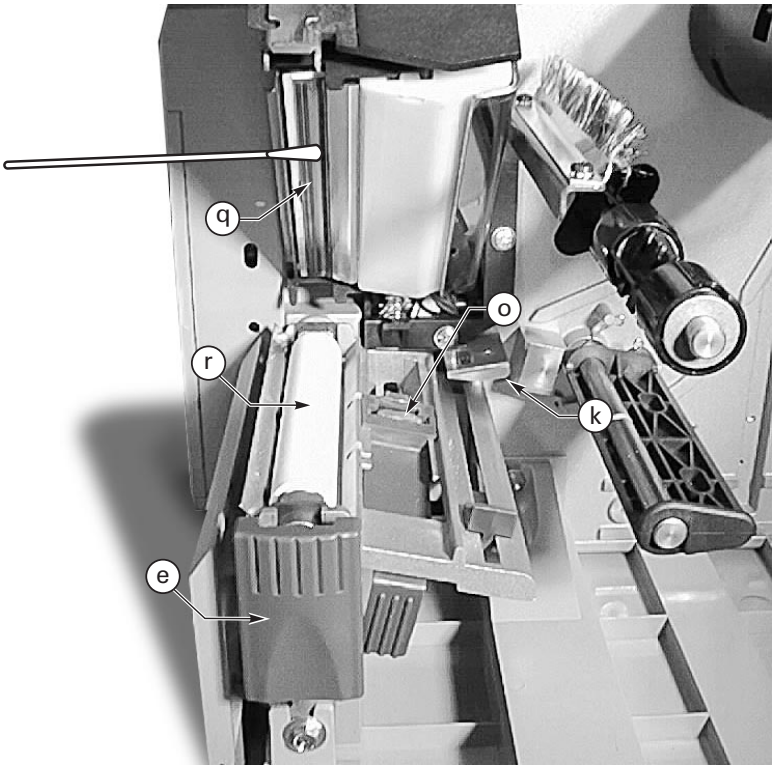

Figure 10. Printhead and Platen Roller Cleaning

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Cleaning the Cutter Module

(For printers equipped with the Cutter option.)

The Cutter Module requires periodic cleaning to remove paper dust and gummed label residue. If labels are not being cut properly, or if the cutter jams with labels, this is an indication that the cutter probably needs cleaning. The cleaning frequency depends on your application and the type of media you use.

When the stationary cutter blade and the v-shaped moveable cutter blade become gummed up with label adhesive and/or paper debris, clean them according to the procedure below. Steps 4 and 5 detail the method of removal of the Cutter Module from the printer. This portion of the procedure will only be required when there is an extremely heavy buildup of adhesive residue.

Refer to Figure 11 during the following cleaning procedure.

1. Turn the AC power off and unplug the printer power cord.
2. Open the Media Door and press the Printhead Open Lever to raise the Printhead Assembly.
3. Remove the thumb screw and lift off the Finger Guard (and Catch Tray if used).
4. Use a 3 mm Allen Wrench to remove the cutter mounting screw.
5. Carefully lift the Cutter Module up and away from the printer.
6. Remove all paper and label residue from the cutter blades and housing.

WARNING!! The cutter blades are very sharp. Take great care in the following step to insure personal safety.

7. Use cotton swabs soaked with a citrus-based cleaner (Goo Gone) to remove all adhesive residue from the cutter blades. (While cleaning, rotate the cutter motor to access the entire length of the moveable blade.)
8. If adhesive has accumulated on the Platen and the Tear/Peel Bar, clean these areas in a similar manner.
9. When the cleaning is completed, reinstall the Cutter Module, the Finger Guard and the Catch Tray, if used.
10. Install media, then close and latch the Printhead Assembly.
11. Connect the printer to an AC power source, and turn the printer on.
12. The printer should be ready to print and cut labels once again.

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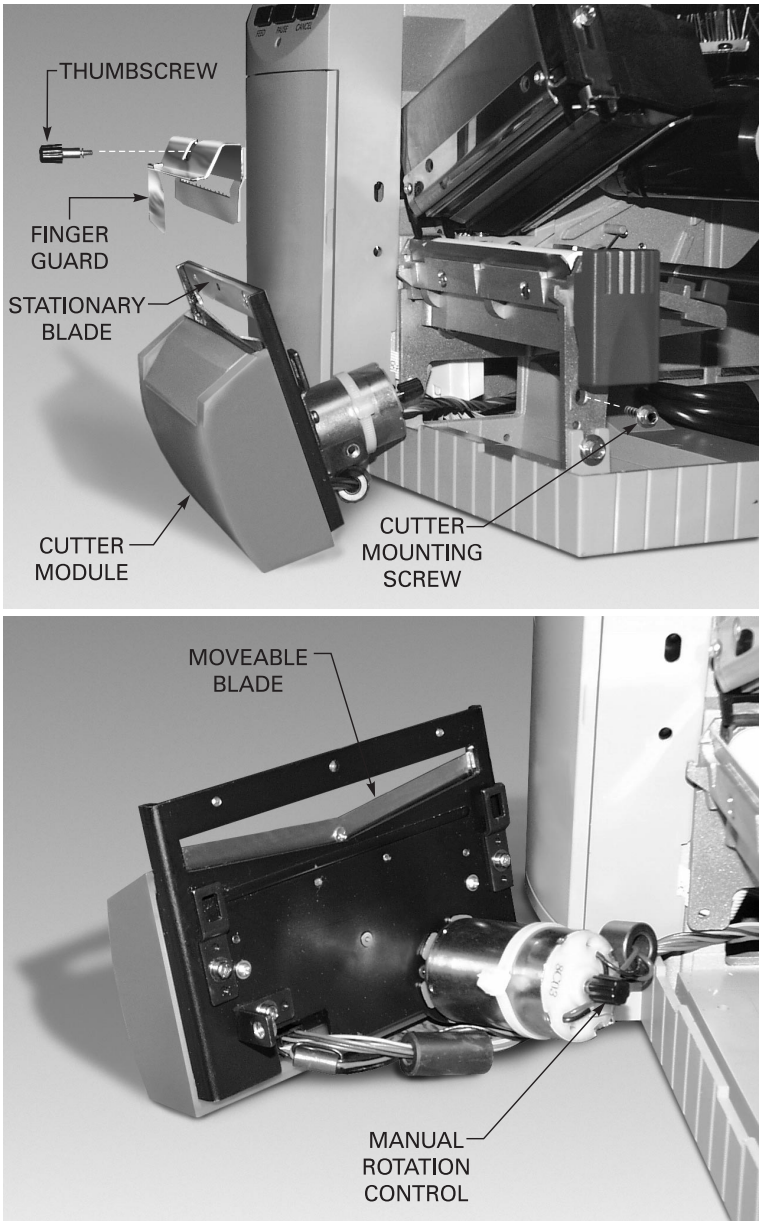

Figure 11. Cutter Cleaning

NOTE: *Disassembly of the Cutter module should only be performed by a Service Technician.*

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Cleaning the Peel Blade

(For printers equipped with the Value Peel or Power Peel option.)

1. Open the Media Door and press the Printhead Open Lever to raise the Printhead Assembly.
2. Refer to Figure 12. Open the Peel Mechanism by gently lifting up on the Media Plate and pivoting it toward you.
3. Refer to Figure 12. The primary area requiring cleaning is the backside of the Separator Bar.
4. Remove the major portion of the accumulated adhesive by pressing the sticky side of a blank label against the adhesive and lifting it away. (Do this step repeatedly until most of the adhesive is gone.)
5. Aggressively wipe the area with a cloth soaked in alchohol to remove any residual adhesive.
6. Move the media backing material out of the way to allow inspection of the Tear/Peel Bar.
7. If any adhesive has accumulated, repeat the cleaning process on the Tear/Peel Bar.
8. When the cleaning process is completed, align the media backing material and return the Media Plate to the operating position.
9. Align the ribbon (if used) as you close and latch the Printhead Assembly.
10. Close the Media Door and resume operation.

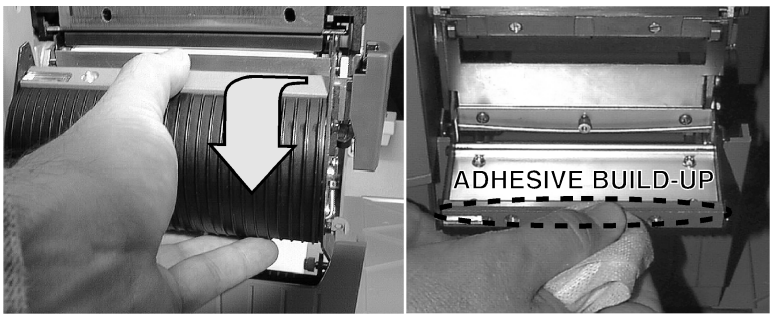

Figure 12. Peel Blade Cleaning

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Lubrication

CAUTION! No lubricating agents of any kind should be used on this printer! Some commercially available lubricants, if used, will damage the finish and the mechanical parts inside the printer.

Printhead Pressure Adjustment

Printhead pressure is adjustable to insure maximum print quality. Refer to Figure 13 and rotate the Pressure Adjustment Dials(s & t) clockwise to increase the pressure or counterclockwise to decrease the pressure of the printhead against the ribbon and/or media.

The amount of pressure required varies from one application to the next and is determined by the type and thickness of the media as well as the media width.

If using narrow media, you may need to reduce the pressure applied by the right hand dial to minimize the pressure over the unused printhead area.

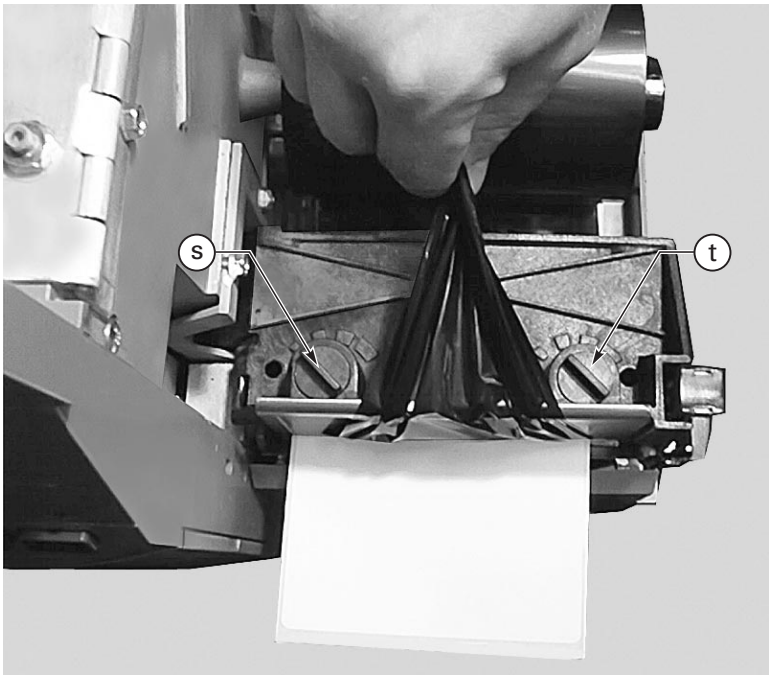

Figure 13. Printhead Pressure Adjustment

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Power Rewind/Power Peel Media Alignment

(For printers equipped with the Power Rewind/Power Peel option.)

An adjustment to the Media Alignment Spindle allows the user to insure that the media or backing material is properly winding onto the Take-up Spindle.

Refer to Figure 14. Turn the adjustment dial(v) clockwise to align the media/backing material more to the left.

Turn the dial counterclockwise to align the media/backing material to align more to the right.

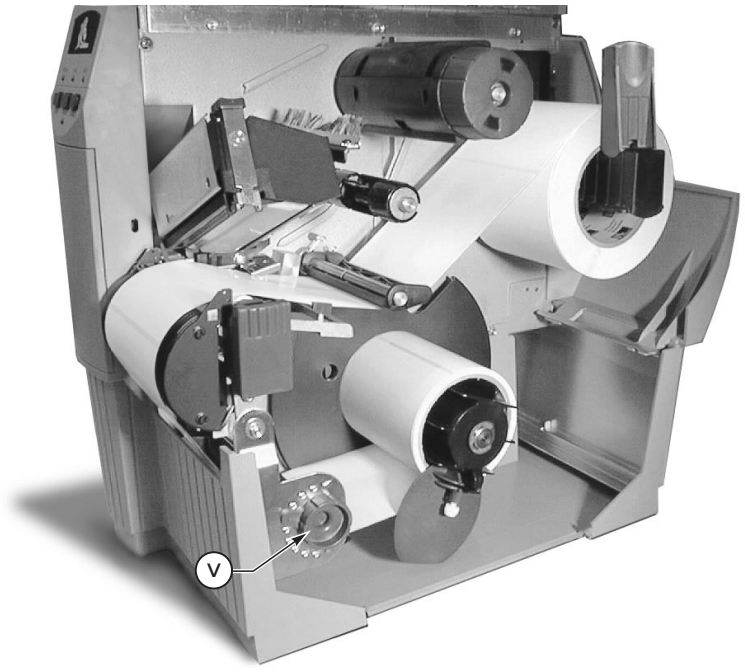

Figure 14. Power Rewind/Power Peel Media Alignment

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Printer Options

LCD Display (Deluxe Front Panel)

The *Z* Series™ printers include the option of replacing the standard front panel with a deluxe front panel containing a Liquid Crystal Display (LCD).

The LCD shows several types of information.

- When the printer completes its Power ON Self Test, the LCD displays an "idle" message.

PRINTER READY
1024K Vxx.x.x

- While a format is printing, a label counter is displayed.

PRINTING
1 OF 99999999

- The LCD also indicates memory conditions when they occur.

CREATING BITMAP	BUILDING FORMAT
STORING GRAPHIC	STORING FORMAT
STORING BITMAP	STORING FONT

- The LCD also displays an error message when an error occurs.

HEAD OPEN	PAPER OUT
RIBBON OUT	RIBBON IN
BUFFER OVERFLOW	CUTTER JAMMED
HEAD COLD	HEAD TOO HOT
OUT OF MEMORY	

NOTE: *When an error condition is corrected, the top line of that error display indicates "ERROR CLEARED." Once all of the errors have been cleared, press the PAUSE key to resume printing.*

- When configuring the printer's operating parameters, the configuration menu is displayed on the LCD. Refer to Appendix A for printer configuration parameters.

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Power Rewind/Power Peel Option

The *Z* Series™ printer supports a rewind option, with the capability of rewinding an entire roll of printed labels (Rewind mode) or backing material only (Peel mode). This option is available as both a factory installed feature and a field-installable kit.

Label Movement in Rewind Mode

In the Rewind mode, labels are printed and fed forward in a continuous sequence. As printing continues, the media is wound onto the Take-Up Spindle.

Label Movement in Peel Mode

In the Peel mode, when a label is completely printed, the printer feeds the label forward to the take-label position. The label hangs from the printer and is held in place by that portion of the label still attached to the backing material. When the operator removes the label, the printer moves the next label forward to "pre-peel" a portion of the label from the backing. The label then backfeeds to be printed. As printing continues, the backing material is wound onto the Take-Up Spindle.

Refer to Appendix A for information on configuring the printer for either the Power Rewind or Power Peel mode of operation.

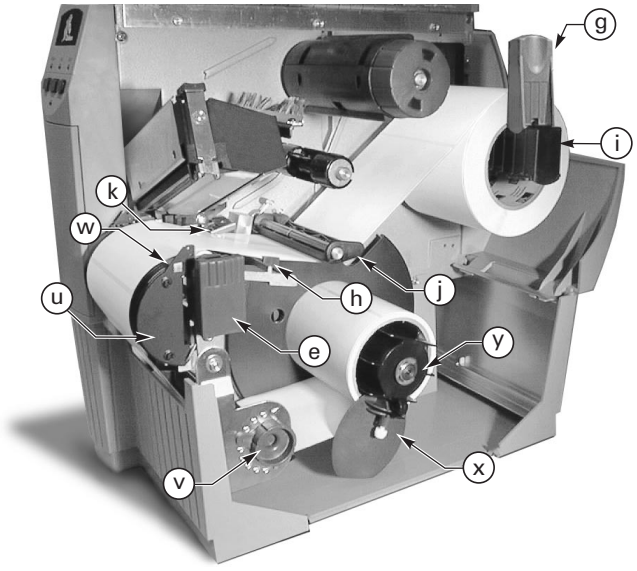

Figure 15. Media Loading (Power Rewind Option)

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Media Loading

Refer to Figure 15 (Power Rewind) or Figure 16 (Power Peel) while loading media.

1. Place the roll of media on the Media Supply Hanger(i) and push it on all the way.
2. Fold the Media Supply Guide(g) up and slide it against the outer edge of the media roll.
3. Press the Printhead Open Lever(e) and raise the Printhead Assembly.
4. Feed the media under the Media Spindle(j), under the Ribbon Sensor(k), and out the front of the printer.
5. Slide the Media Guide(h) in until it is against the outer edge of the media.
6. Pull about three feet of media through the front of the printer.
7. **(For Power Rewind)** Pass the media down over the Media Plate(u), through the printer housing, and under the Media Alignment Spindle(v).

   (For Power Peel) Lift the Media Plate(u) and rotate it forward. Remove the labels from the backing material, then pass the backing over the Peel Bar(w), down behind the Media Plate(u), through the printer housing, and under the Media Alignment Spindle(v). Return the Media Plate to its operating position.

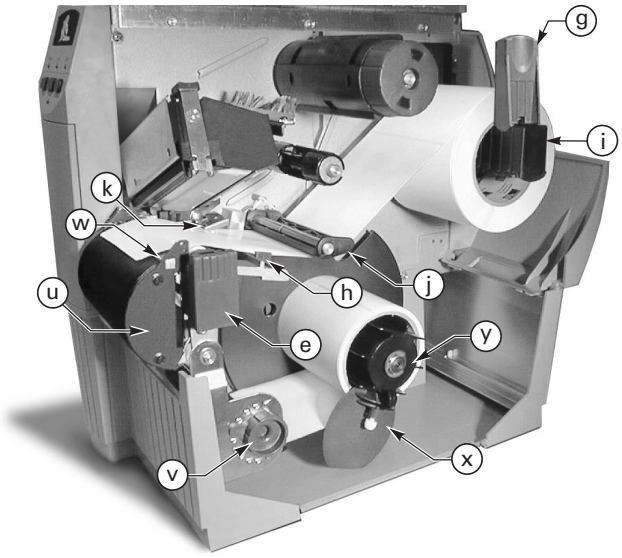

Figure 16. Media Loading (Power Peel Option)

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8. Loosen the thumbscrew and slide the Rewind Media Guide(x) out to the end of the spindle and rotate it to its horizontal position.
9. Place an empty media core on the Rewind Spindle(y), wrap the media around the core, and turn the spindle counterclockwise to wind up the excess material.
10. Rotate the Rewind Media Guide to its vertical position, slide it in against the media, and tighten the thumbscrew that locks it into position.
11. Go to the “Loading Ribbon” procedure earlier in this guide; then continue through the “Configuration” and “Media Sensor Positioning” processes.

Media/Backing Removal

1. Loosen the thumbscrew and slide the Rewind Media Guide(x) out to the end of the spindle and rotate it to its horizontal position.
2. Cut the media/backing material prior to where it winds onto the Take-up Spindle.
3. Slide the roll of media/backing material from the Take-Up Spindle.

Value Peel Option

The *Z* Series™ printer also features a Value Peel option, supporting the Peel-off mode. This option is available as both a factory installed feature and a field installable kit.

Label Movement in Peel Mode

This option ***does not*** capture the backing material on a spindle. Instead, the backing drops down from the front of the printer.

In the Peel mode, when a label is completely printed, the printer feeds the label forward to the take-label position. The label hangs from the printer and is held in place by that portion of the label still attached to the backing material. When the operator removes the label, the printer moves the next label forward to “pre-peel” a portion of the label from the backing. The label then backfeeds to be printed.

Refer to Appendix A for information on configuring the printer for the Value Peel mode of operation.

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Media Loading

Refer to Figure 17 while loading media.

1. Place the roll of media on the Media Supply Hanger(i) and push it on all the way.
2. Fold the Media Supply Guide(g) up and slide it against the outer edge of the media roll.
3. Press the Printhead Open Lever(e) and raise the Printhead Assembly.
4. Feed the media under the Media Spindle(j), under the Ribbon Sensor(k), and out the front of the printer.
5. Slide the Media Guide(h) in against the outer edge of the media.
6. Lift the Peel Assembly(u) and rotate it forward, away from the printer.
7. Pull about 12 to 18 inches of backing only down over the edge of the Peel/Tear Bar(w) and close the printhead.
8. Return the Peel Assembly to its operating position. Insure the Assembly is reseated on the tabs of the Peel/Tear Bar(w), go to the "Loading Ribbon" procedure earlier in this guide; then continue through the "Configuration" and "Media Sensor Positioning" processes.

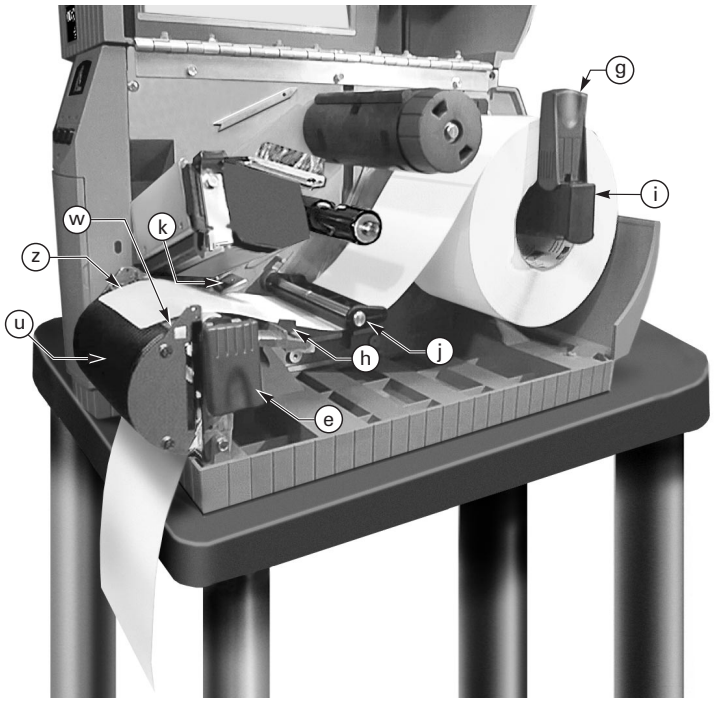

Figure 17. Media Loading (Value Peel-Off Option)

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Cutter Option

The *Z* Series™ printer also features a cutter option. This option is available as both a factory installed feature and a field installable kit. A label catch tray is included which holds up to 10 labels up to 6" in length.

Label Movement in Cutter Mode

When the label is completely printed, the printer feeds the media into the cutter mechanism. The cutter blade is activated and the printer waits for the cutter mechanism to complete its cycle. After cutting, the printer backfeeds the media to the rest position or to the start of the next label if another label is in the print queue. If the cut cycle is not completed, the printer automatically stops the print cycle and turns the ERROR LED ON. This will normally identify a cutter jam.

Refer to Appendix A for information on configuring the printer for the Cutter mode of operation.

Media Loading

Refer to Figure 18 while loading media.

1. Place the roll of media on the Media Supply Hanger(i) and push it on all the way.
2. Fold the Media Supply Guide(g) up and slide it against the outer edge of the media roll.
3. Press the Printhead Open Lever(e) and raise the Printhead Assembly.

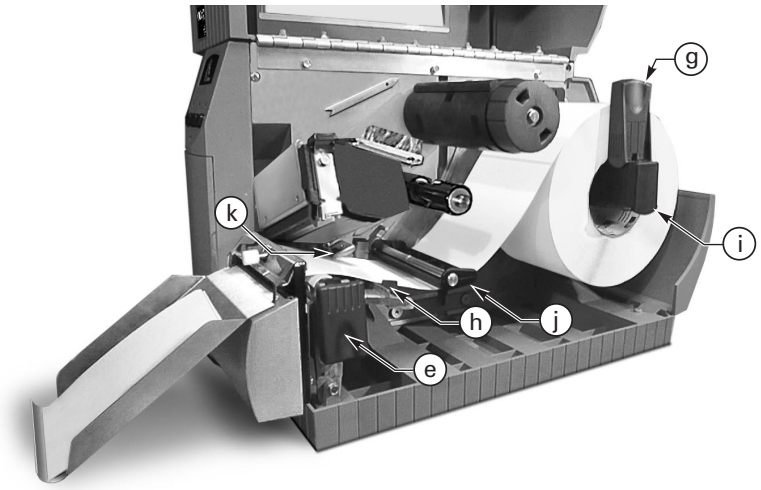

Figure 18. Media Loading (Cutter Option)

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4. Feed the media under the Media Spindle(j), under the Ribbon Sensor(k), through the Cutter Module, and out the front of the printer.
5. Slide the Media Guide(h) in against the outer edge of the media.
6. Go to the “Loading Ribbon” procedure earlier in this guide; then continue through the “Configuration” and “Media Sensor Positioning” processes.

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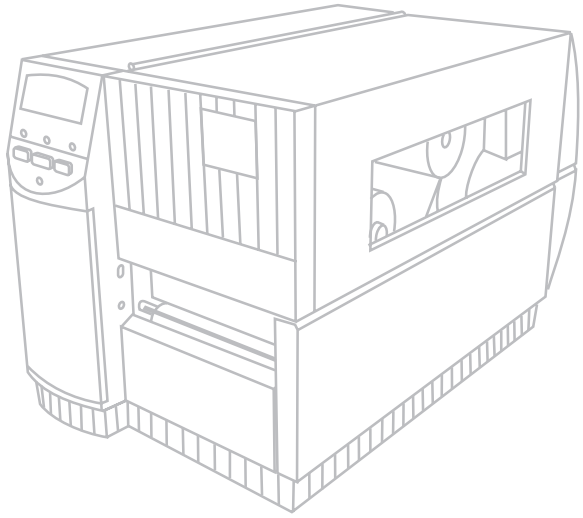
Electronics Options

PCMCIA Option

An optional PCMCIA Port is available for the *Z* Series™ printer. This option is available as both a factory installed feature and a field installable kit.

Access to the PCMCIA port is from the rear of the printer. Optional PCMCIA Memory Cards will provide non-volatile storage for label formats, downloadable fonts, graphics files, etc. The content of the PCMCIA Memory Card is not lost when power is turned OFF.



DRAM Memory Option

A 2 Megabyte memory upgrade is available for the *Z* Series™ printer as both a factory installed feature and a field installable kit. This additional memory area can be used to store a higher quantity of label formats or larger label formats. The content of the DRAM Memory is lost when power is turned OFF.

This option consists of an electronic memory device which is inserted into a holder on the Main Logic Board inside the printer.

Flash Memory Option

Two non-volatile memory options (a 1 Megabyte and a 2 Megabyte) are available for the *Z* Series™ printer. This additional memory area can be used to store optional printer fonts, graphic formats, and complete label formats.

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Once the option is installed in the printer, information to be stored in Flash Memory is downloaded to the printer from the host computer. A specific ZPLcommand is then sent to the printer which causes the information to be stored in the Flash Memory. The content of the Flash Memory is not lost when power is turned OFF.

Communication Options

Ethernet

Ethernet Thinnet and 10BaseT connectivity are available through an external connection to the parallel port at the rear of the printer.

IPX, LAT, NetBIOS/Net BEUI, TCP/IP protocols are supported with a data burst rate of 150 KB. HP Bitronics mode is supported to provide bi-directional high-speed. It is SNMP compatible and supports MIB I, MIB II and Parallel MIB as well as MPSCON: (NOVELL Netware) PC console configuration utility IPX.

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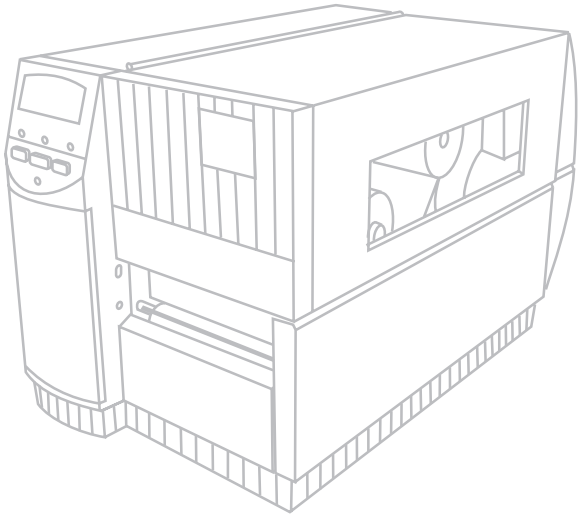

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Troubleshooting

Power On Self-Test

A Power On Self Test (POST) is performed each time the printer is turned ON. During this test, the front panel LEDs will turn ON and OFF to ensure proper operation. At the end of this self test, only the POWER LED will remain lit.

Once the Power ON Self Test is complete, the media is advanced to the proper rest position as determined by the programmed media feed setting. Continuous media is assumed to be at the proper rest position.

Troubleshooting Tables

The following tables provide trouble symptoms, a diagnosis of specific causes and a recommended action which should result in proper printer operation.

SYMPTOM	DIAGNOSIS	ACTION
All LEDs never light.	No AC Power applied to the printer.	Ensure the AC Power cable is connected to a working voltage source.
	Faulty AC Power Fuse.	Refer to Appendix C for Fuse replacement procedures.
	No voltage available from the internal power supply.	Call a Service Technician.
Printer locks up when running the Power On Self Test with some or all LEDs ON.	Printer not configured properly.	Refer to the PAUSE and FEED Key Self Test and reload factory defaults; then reconfigure the printer for the application.
	Internal printer failure.	Call a Service Technician.

Table 2. Power ON Troubleshooting

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SYMPTOM	DIAGNOSIS	ACTION
Printer stops, PAUSE LED ON and ERROR LED FLASHING Fast.	Printhead is not fully closed.	Close printhead completely.
	Malfunctioning Printhead Open Sensor.	Call a Service Technician.
Printer stops, PAUSE LED BLINKING.	Printer in Peel mode and no Peel option installed.	Change printer operating mode to fit application.
Printer stops. PAUSE LED ON and ERROR LED FLASHING Slow.	Printhead element is overheated.	Printer resumes printing when the printhead element cools.
Dots missing in printed area of label.	Printhead element bad. Print quality problems.	Replace the printhead.
Loss of printing registration on labels.	Possible Media Sensor problem.	Adjust Sensor Position and Call a Service Technician if necessary.
	Printer set for non-continuous media, but continuous media loaded.	Set printer for correct media.
	Improperly adjusted Media Guides.	Reposition Media Guides.
Excessive Vertical Drift in Top-of-Form registration.	Incorrect media loaded or Media Sensor adjustments.	Reload Media and check Media Sensor position.
Light vertical lines running through all labels.	Dirty printhead.	Clean printhead.
	Defective printhead elements.	Replace the printhead.
Light printing or no printing on the left or right side of the label.	Too little printhead pressure.	Adjust printhead pressure.
Short printed lines at 45° to label edge on left or right side of label.	Too much Printhead pressure.	Adjust Printhead pressure.
Fine gray lines on blank labels at angles.	Wrinkled ribbon.	See Wrinkled Ribbon in this Table.
Long tracks of missing print on several labels.	Wrinkled ribbon.	See Wrinkled Ribbon in this Table.
	Print Element damaged.	Replace the printhead.

Continued on the following page.

Table 3. Printer Troubleshooting

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SYMPTOM	DIAGNOSIS	ACTION
Wrinkled ribbon.	Ribbon fed through printer incorrectly.	Reinstall ribbon.
	Incorrect Darkness setting.	Set to the lowest value needed for good print quality.
	Incorrect Printhead pressure.	Readjust Printhead pressure.
	Media not feeding properly; it is walking from side to side.	Readjust Media Guides.
	Continuing problems.	Call a Service Technician.
Misregistration and misprint of 1 to 3 labels.	Media was pulled when motor was not moving.	Open and close the printhead so it calibrates to find the label length.
	Incorrect Media Sensor Position.	Reposition Media Sensor.
	Media or ribbon improperly loaded.	Reload Media and Ribbon.
Changes in parameter settings did not take effect.	Parameters are set or saved incorrectly.	Reload the Factory Defaults, reconfigure the printer, cycle the Power OFF and ON.
	Continuing problems.	Call a Service Technician.
ZPL was sent to printer, but not recognized. The DATA LED remains OFF.	Communications parameters or DIP Switches are set incorrectly.	Check and reset communication parameters if needed.
	Prefix and delimiter characters set in printer configuration do not match the ones sent in the ZPL Label Formats.	Set the characters in the printer to match ZPL format. Check Configuration Label for correct characters. If problem continues, check the ZPL format for changed **^CC**, **^CT**, and **^CD** instructions.

Continued on the following page.

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SYMPTOM		DIAGNOSIS	ACTION
In Peel-Off Mode, skewed or stuck labels.		Glue material from back of labels causing media movement problems.	Perform maintenance and clean the printer.
		Media and backing not aligned in printer.	Check media guide positions.
Labels are not being cut.		Cutter Mode not selected.	Reconfigure the printer.
The Cutter is not cutting labels cleanly.		Cutter is dirty.	Clean Cutter Blades.
		Cutter Blades are dull.	Replace Cutter Module.
Labels are jamming up in the Cutter or are being cut more than once.		Cutter is dirty.	Clean Cutter Blades.
		Label length too short.	Increase label length.
Printing stops. PAUSE, and ERROR LEDs Solid ON.		Out of media.	Load media.
		Out of ribbon	Load ribbon
	For printers with the Cutter Option installed.	Media jammed in the Cutter.	Remove media, clean Cutter if necessary.
		Cutter Module is dirty.	Clean Cutter Module.
		If error condition persists after attempting each of the above solutions, call a Service Technician.	

Printer Self-Tests

The *Z* Series™ printer is designed to work with most Zebra media and ribbon combinations, right out of the box. However, in some applications, changes to the printer's configuration and mechanical settings may be required. For these situations, printer self-test labels can be used to check print quality and insure proper operation.

These self-tests produce sample printouts and provide specific information which helps determine the operating conditions for the printer. Each self-test is enabled by pressing a specific Front Panel key or combination of keys while turning the AC Power Switch ON. Keep the key(s) pressed until the first front panel LED turns OFF. Once the Power-On Self Test is completed, the selected self test begins automatically.

NOTES: *Prior to performing self-tests, disconnect all data interface cables from the printer.*

When canceling a self-test prior to its actual completion, always turn the printer power OFF and then back ON to restart the printer.

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Color profile: Disabled
Composite Default screen

Make sure that your print width is set correctly for the media you are using before you run any self-tests, otherwise the test may print out on the platen. If your media is not wide enough or long enough to display a complete test label, unexpected and/or undesired results may occur.

When performing these self-tests while in the Peel Mode, you must remove the labels as they become available.

CANCEL Key Self-test

Press and hold the CANCEL key while turning the printer power ON. Release the key anytime after the first front panel LED turns OFF. The CANCEL key self-test prints a configuration label showing:

- Printer configuration
- Installed options
- Software version
- Copyright notice

Figure 19 shows an example of the Printer Configuration Label. The configuration information will print over several labels if a label is not long enough to display all of the configuration information at one time.

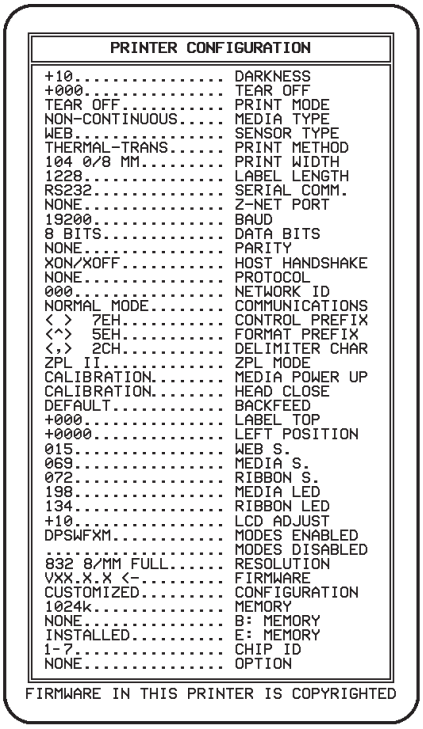

Figure 19. CANCEL Key Self-test Label

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Color profile: Disabled
Composite Default screen

PAUSE Key Self-test

Press and hold the PAUSE key while turning the printer power ON. Release the key anytime after the first front panel LED turns OFF. The PAUSE key self-test prints a series of labels which can be used when making print quality adjustments.

- 9999 labels at two inches per second pausing every 15 labels
- 9999 labels at six inches per second pausing every 15 labels
- 9999 labels at two inches per second pausing every 50 labels
- 9999 labels at six inches per second pausing every 50 labels

When the printer pauses, press the PAUSE key to restart printing at the same speed. While paused, press the CANCEL key to switch to the next set of labels.

Figure 20 provides an example of the PAUSE key self-test label.

Figure 20. PAUSE Key Self-Test Label

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Color profile: Disabled
Composite Default screen

FEED Key Self-test

Press and hold the FEED key while turning the printer power ON. Release the key anytime after the first front panel LED turns OFF.

The quantity of labels printed during this print quality test depends on the dot density of the printhead.

- 300 dpi printers: 7 labels are printed at the 2 ips and 6 ips print speeds.
- 200 dpi printers: 7 labels are printed at the 2 ips, 6 ips and 10 ips print speeds.

Each label is printed at a different darkness setting, starting at three settings below the currently configured value and continuing to increase until it is three settings darker than the configured value. The relative darkness and speed are printed on each label. The bar codes on these labels can be ANSI-graded to check print quality.

Figure 21 provides an example of the FEED key self-test label.

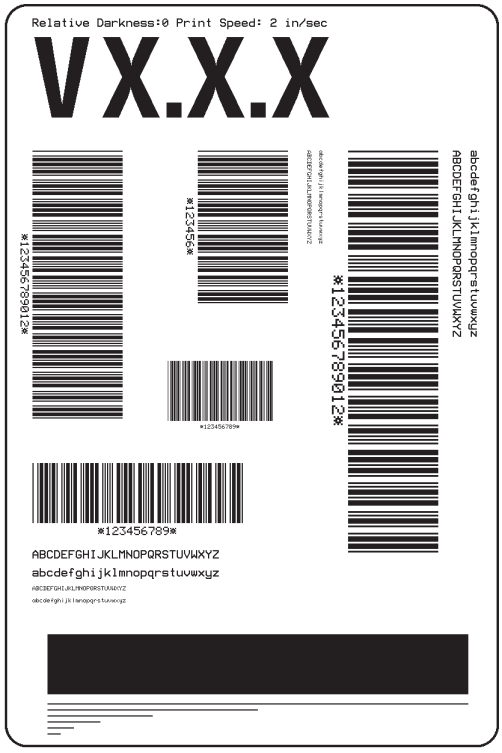

Figure 21. FEED Key Self-Test Label

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Color profile: Disabled
Composite Default screen

PAUSE and CANCEL Key Self-test

Press and hold both the PAUSE key and CANCEL key while turning the printer power ON. Release both keys anytime after the first front panel LED turns OFF.

The PAUSE and CANCEL key self-test prints a sequentially numbered series of 500 labels. When making print quality adjustments, these labels should be observed o insure the highest print quality has been set.

Figure 22 provides an example of the FEED key self-test label.

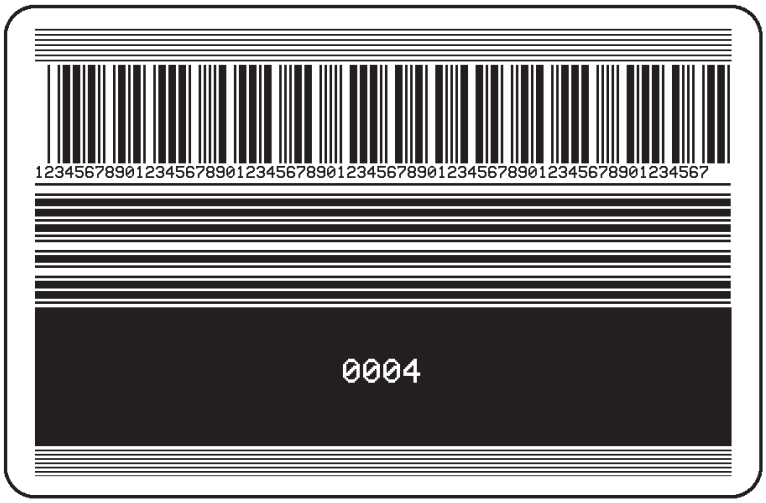

Figure 22. PAUSE and CANCEL Key Self-test Label

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Color profile: Disabled
Composite Default screen

Communications Diagnostic Self-test

The Communications Diagnostic Mode is a troubleshooting tool for checking the interconnection between the printer and the host computer.When “Diagnostics” is selected, all data sent to the printer will be printed as straight ASCII hex characters. The printer prints all received characters including control codes like CR (Carriage Return).

To enter the Communications Diagnostics mode, open the front panel door and press and hold the + key while turning the printer power ON. Release the key anytime after the first front panel LED turns OFF.

Send a label format from the host computer to the printer and observe the printout on the label stock. Figure 23 provides an example of the Diagnostic Mode printout.

NOTES: *An FE indicates a framing error.*
An OE indicates an overrun error.
An PE indicates a parity error.
An NE indicates noise.

If errors are indicated, check that your communication parameters are correct.

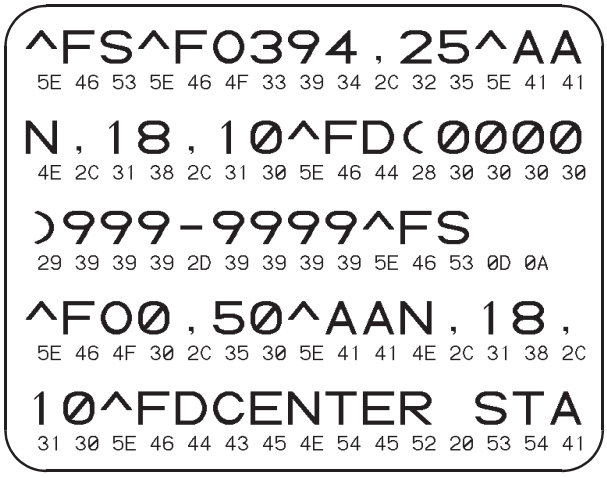

Figure 23. Communications Diagnostics Self-test

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Color profile: Disabled
Composite Default screen

Media and Ribbon Sensor Profile

The Media and Ribbon Sensor Profile may be used to troubleshoot registration problems that may be caused when the Media Sensor experiences difficulty in determining web location between labels.

To print a Media and Ribbon Sensor Profile, you must press and hold the PAUSE key, FEED key, and CANCEL key while turning the printer power ON. Release all three keys anytime after the first front panel LED turns OFF. Figure 24 provides an example of the Media and Ribbon Sensor Profile sample printout.

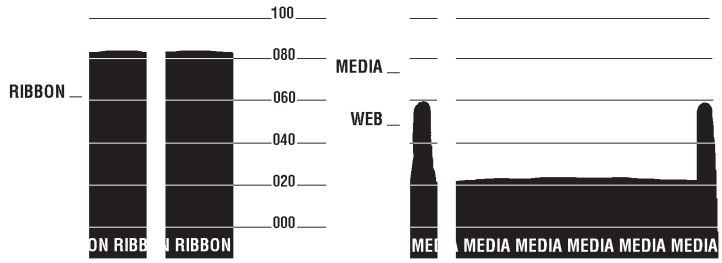

Figure 24. Media & Ribbon Sensor Profile

Resetting Factory Defaults

From time to time, it may be necessary to return the printer configuration to a "known" state. A set of Factory Defaults can be loaded into the printer as a starting point from which one can then reconfigure the printer for the application desired.

To reset Factory Defaults, press and hold both the PAUSE and FEED keys while turning the printer power ON. Release both keys anytime after the first front panel LED turns OFF. Once the Power-On Self Test is completed, open the printer's front panel door and press the Print Darkness Key two times to save the Factory Defaults parameters in EEPROM memory. To signify that the parameters have been saved, all three Control LEDs will flash on then off.

(An alternate method of setting Factory Defaults is by sending the ZPL commands “^JUF^JUS” to the printer.) In addition, for printers with the deluxe front panel, factory default settings may be saved through the LCD configuration.

As of Firmware Release V22.8.4, this process no longer initializes the optional on-board flash menory device nor the optional PCMCIA Card.

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Color profile: Disabled
Composite Default screen

Initializing the Flash Memory and PCMCIA Card

As of Firmware release V22.8.4, a new procedure is used to initialize the optional on-board Flash Menory device and the optional PCMCIA Card.

Prior to uploading new contents into the Flash Memory and/or the PCMCIA Card, it is first necessary to initialize these devices. This procedure is performed by pressing and holding all three left hand control keys inside the printer's front panel door while turning the printer power ON. The keys may be released anytime after the first front panel LED turns OFF. The Front Panel DATA LED will remain on until the initialization process is finished.

NOTE: *Initialization will erase the current contents of both devices. Be sure to enable the Write Protect feature of the PCMCIA Card if you do not want to initialize this device.*

Automatically Executed Format

Once the Power On Self Test is completed and any self test labels are printed, a check is made of the optional PCMCIA Memory Card and then the optional Flash Memory for the presence of a stored format named AUTOEXEC.ZPL. If an AUTOEXEC.ZPL format is encountered, it is automatically recalled and the preformatted labels are printed.

If no AUTOEXEC.ZPL format is found, the printer enters the normal operating mode and waits for operator input from the front panel or label format data to be received from the host computer.

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Composite Default screen

Print Error Conditions

There are several error conditions that effect printing. Some actually stop the printing process completely, while others are only reported to the operator or host system. A printhead open error condition stops any media movement, while the printhead under temperature error has no effect on media movement. Some error conditions must be corrected before the printer will feed or print labels again.

Media Out, Ribbon Out, Head Open, or Cutter Error

A media out, ribbon out, or cutter error condition stops the printer immediately and turns the ERROR LED on solid. A head open condition also stops the printer and the ERROR LED blinks. The label being printed, when the condition occurs, is only partially printed. The PAUSE LED is turned ON and the printer waits for the errors to be cleared and the PAUSE key to be pressed. If all error conditions are cleared when the PAUSE KEY is pressed, the PAUSE LED will turn OFF. Media registration occurs through the auto-calibration function (for non-continuous media) and then the printing process resumes.

Printing resumes by reprinting the label that was in process when the condition occurred, unless the printer is configured to NOT reprint partial labels. All of the other features of the printer (e.g., communications, parsing, formatting, and cancel) function normally during the error condition and while the printer is “recovering.”

The feature of reprinting a label after an error condition occurs can be turned off by a ZPL command. The type of media (continuous or non-continuous) being monitored by the printer is controlled by a setting on the front panel (LCD or DIP switches).

Printhead Over Temperature

When the printhead becomes too hot, all printing stops and the ERROR LED blinks slowly. The printer will wait until the printhead has returned to an acceptable temperature prior to restarting. All of the other features of the printer function normally while the head is over-temperature, including feeding and calibrating without printing a label.

Printhead Under Temperature

A similar condition occurs when the printhead is cooler than desired. The printer does NOT stop but the ERROR LED blinks slowly to indicate the error condition. All other printer features continue to work normally. This includes printing, which should heat the printhead to the desired temperature.

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Color profile: Disabled
Composite Default screen

Printer Specifications

NOTE: Printer specifications are subject to change without notice. Your printer may not have all of the options described in these specifications. If you have questions as to the ability of the Z Series™ printer to meet the needs of your application, contact either your Zebra Distributor or Zebra Technologies Corporation.

General Specifications

SPECIFICATION		Z4000 PRINTER	Z6000 PRINTER
Height		11.5" (292.5 mm)	11.5" (292.5 mm)
Width		8.25" (209.6 mm)	12.8" (325.1mm)
Depth		16" (406.4 mm)	18.3" (464.8 mm)
Weight (option-dependent)		24.5 lbs. (11.1 kg)	26.5 lbs. (12.0 kg)
Electrical		90 to 265VAC, 48-62 Hz	
		5 Amps (Fused)	
Agency Approvals		Built to CISPR 22B, IEC 950, 801-2,-3, and -4 standards. Complies with FCC class "B" and Canadian Doc. class "A" rules. Carries the CE mark of compliance.	
Temperature	Operating	40° F to 105° F (5° C to 40° C)	
	Storage	-40° F to 140° F (-40° C to 60° C)	
Relative Humidity		5% to 85%, non-condensing	
Communications Interfaces		RS-232/CCITT V.24 and RS-485 Serial Data Interface; 110 to 38400 Baud, Parity, Bits/Char., and Xon-Xoff or DTR/DSR Handshake Protocols - all selectable.	
		RS-485 Serial Data Interface; 110 to 38400 Baud, Parity, Bits/Char. All selectable. Xon-Xoff Handshake Protocol required.	
		8-Bit Parallel Data Interface; Supports IEEE 1284 bi-directional parallel communications in "nibble mode"	
		Error Detection CRC Protocol	

Table 4. General Specifications

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Color profile: Disabled
Composite Default screen

Printing Specifications

PRINTING SPECIFICATIONS			Z4000 PRINTER	Z6000 PRINTER
Print Resolution			203 dpi (8 dots/mm) or 300 dpi (11.8 dots/mm)	
Dot size		203 dpi 300 dpi	0.00492" (0.125 mm) square 0.0033" x 0.0039" (0.84 mm x 0.99 mm)	
Maximum print width			4.1" (104 mm)	6.6" (168 mm)
Print length	Minimum		1 dot row	
	Maximum continuous media (* 39" Max for non-continuous media)	Std memory 8 dot/mm 12 dot/mm	37" (940 mm) 16" (406 mm)	23" (584 mm) 10" (254 mm)
		Opt memory 8 dot/mm 12 dot/mm	*136" (3.5 m) *61" (1549 mm)	*84" (2.1 m) 38" (965 mm)
Bar code modulus ("X") dimension			5 mil to 50 mil	
Programmable constant printing speeds			2"/sec. (50.8 mm/sec.)	
			3"/sec. (76.2 mm/sec.)	
			4"/sec. (101.6 mm/sec.)	
			5"/sec. (127.0 mm/sec.)	
			6"/sec. (152.4 mm/sec.)	
Additional printing speeds for printers with the 203 dots/inch (8 dots/mm) printheads.			7"/sec. (177.8 mm/sec.)	
			8"/sec. (203.2 mm/sec.)	
			9"/sec. (228.6 mm/sec.)	
			10"/sec. (254.0 mm/sec.)	
Thin film printhead with Energy Control				

Table 5. Printing Specifications

Ribbon Specifications

RIBBON SPECIFICATION			Z4000 PRINTER	Z6000 PRINTER
Ribbon Width (*Zebra recommends using ribbon at least as wide as the media to protect the printhead from wear.*)		Minimum	.94" (23.9 mm)	1.57" (39.9 mm)
		Maximum	4.3" (110 mm)	6.85" (174 mm)
Standard Lengths	2:1 media to ribbon roll ratio		984' (300 m)	
	3:1 media to ribbon roll ratio		1476' (450 m)	
Ribbon core inside diameter			1.0" (25.4 mm)	

Table 6. Ribbon Specifications

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Composite Default screen

Media Specifications

MEDIA SPECIFICATION			*Z*4000 PRINTER	*Z*6000 PRINTER
Total media width	Maximum		4.5" (115 mm)	7.0"(178 mm)
	Minimum		1.0" (25.4 mm)	2.0"(50.8 mm)
Label length	Maximum		See "Printing Specifications"	
	Minimum	Tear-Off Mode	0.5" (12.7 mm).	
		Rewind Mode	0.5" (12.7 mm)	
		Peel-Off Mode	1.0" (25.4 mm)	
		Cutter Mode	1.0" (25.4 mm)	
Total thickness (includes liner)	Maximum (*If above 0.01", printhead pressure may need adjustment*)		0.010" (0.25 mm)	
	Minimum		0.0023" (0.058 mm)	
Core size			3.0" (76.2 mm)	
Maximum roll diameter			8.0" (203 mm)	
Inter-label gap	Maximum		0.157" (4 mm)	
	Minimum [*0.118" (3 mm) preferred*]		0.079" (2 mm)	
Ticket/tag notch size (Width x Length)			0.236" (6 mm) x 0.12" (3.0 mm)	

Pressure sensitive media: release liner must be free of preprint (with the exception of black mark registration) and is recommended to not exceed .0035" (.089 mm) thickness (60 lb stock).

Table 7. Media Specifications

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Composite Default screen

Zebra Programming Language (ZPL II®)

- Downloadable graphics (with data compression)
- Bit image data transfer and printing, mixed text/graphics
- Format inversion
- Mirror image printing
- Four-position field rotation (0°, 90°, 180°, 270°)
- Slew command
- Serialized fields
- Programmable quantity with print pause
- Communicates in printable ASCII characters
- Controlled via mainframe, mini, PC, Portable Data Terminal
- In-Spec OCR-A and OCR-B
- UPC/EAN [nominal 100% magnification (6 dot/mm printheads only)]

Bar Codes

- Code 11
- Code 39 (supports ratios of 2:1 to 3:1)
- Code 49 (2-dimensional bar code)
- Code 93
- Code 128 (supports serialization in all subsets and UCC case codes)
- Codabar (supports ratios of 2:1 to 3:1)
- Codablock
- Interleaved 2 of 5 (supports ratios of 2:1 to 3:1, modulus 10 check digit)
- Industrial 2 of 5
- Standard 2 of 5
- LOGMARS
- Plessey
- EAN-8, EAN-13, EAN EXTENSIONS
- UPC-A, UPC-E, UPC EXTENSIONS
- MSI
- PDF-417 (2-dimensional bar code)
- POSTNET
- MaxiCode
- Datamatrix
- QR Code (added with Firmware Release V22.8.3
- Check digit calculation where applicable

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Color profile: Disabled
Composite Default screen

Standard Printer Fonts

For more information on fonts, refer to the *ZPL II Programming Guide*.

203 DOTS/INCH (8 DOTS/MM) PRINTHEAD				
Fonts	**Dot Matrix (h x w)** (Defaults)	**Type***	**Minimum Character Size (h x w)**	**Max Char /In**
A	9 x 5	U-L-D	0.044″ x 0.030″	33.3
B	11 x 7	U	0.054″ x 0.044″	22.7
C, D	18 x 10	U-L-D	0.089″ x 0.059″	16.9
E	28 x 15	OCR-B	0.138″ x 0.098″	10.2
F	26 x 13	U-L-D	0.128″ x 0.079″	12.7
G	60 x 40	U-L-D	0.295″ x 0.236″	4.2
H	21 x 13	OCR-A	0.103″ x 0.093″	10.8
GS	24 x 24	SYMBOL	0.118″ x 0.118″	8.5
Ø	15 x 12	SCALEABLE (SMOOTH) FONT		
* Type: U - Upper Case, L - Lower Case, D - Descenders				

300 DOTS/INCH (11.8 DOTS/MM) PRINTHEAD				
Font	**Dot Matrix (h x w)** (Defaults)	**Type***	**Minimum Character Size (h x w)**	**Max Char /In**
A	9 x 5	U-L-D	0.030″ x 0.020″	50.8
B	11 x 7	U	0.036″ x 0.030″	33.8
C, D	18 x 10	U-L-D	0.059″ x 0.040″	25.4
E	42 x 20	OCR-B	0.138″ x 0.085″	23.4
F	26 x 13	U-L-D	0.085″ x 0.053″	19.06
G	60 x 40	U-L-D	0.197″ x 0.158″	6.36
H	34 x 22	OCR-A	0.111″ x 0.098″	10.02
GS	24 x 24	SYMBOL	0.079″ x 0.079″	12.7
Ø	Variable	SCALABLE (SMOOTH) FONT		
* Type: U - Upper Case, L - Lower Case, D - Descenders				

- Bit-mapped fonts A, B, D, E, F, G, H, and GS are expandable up to 10 times, height- and width-independent. However, fonts E and H (OCR-B and OCR-A) are not considered in-spec when expanded.
- The Scaleable Smooth Font (CG Triumvirate™ Bold Condensed) is expandable on a dot-by-dot basis, height- and width-independent, while maintaining smooth edges, to a maximum of 1500 x 1500 dots.
- IBM Code Page 850 International characters available in fonts A, B, D, E, F, G and Ø through software control.

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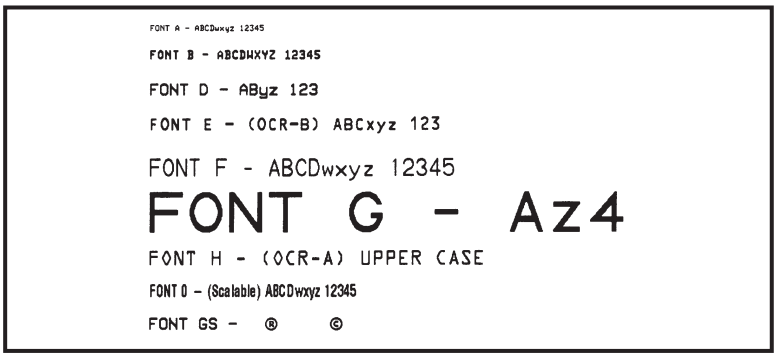
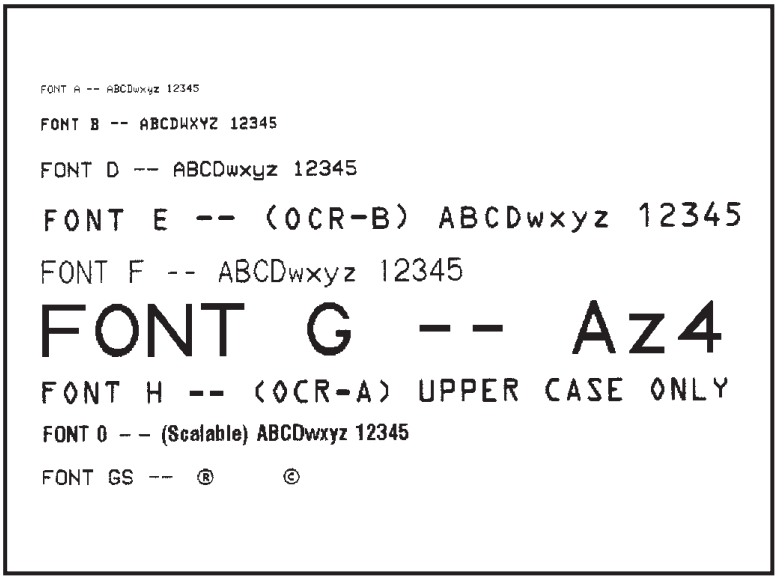
Color profile: Disabled
Composite Default screen

Standard Printer Font Examples


FONT A - ABCDwxyz 12345
FONT B - ABCDWXYZ 12345
FONT D - AByz 123
FONT E - (OCR-B) ABCxyz 123
FONT F - ABCDwxyz 12345
FONT G - Az4
FONT H - (OCR-A) UPPER CASE
FONT 0 - (Scalable) ABCDwxyz 12345
FONT GS - ® ©

Default Printer Fonts - 300 dots/inch (12 dots/mm)


FONT A -- ABCDwxyz 12345
FONT B -- ABCDWXYZ 12345
FONT D -- ABCDwxyz 12345
FONT E -- (OCR-B) ABCDwxyz 12345
FONT F -- ABCDwxyz 12345
FONT G -- Az4
FONT H -- (OCR-A) UPPER CASE ONLY
FONT 0 - - (Scalable) ABCDwxyz 12345
FONT GS -- ® ©

Default Printer Fonts - 203 dots/inch (8 dots/mm)

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Color profile: Disabled
Composite Default screen

Optional Printer Fonts

There are many optional character fonts that can be purchased for your *Z* Series™ printer, in addition to those which are standard in the unit. From time to time, additions may be made to the list of available fonts. Contact your sales representative for further information.

Once installed, the optional fonts can be used in addition to the standard fonts available in the printer. Refer to your *ZPL II Programming Guide* or, if using another software package to drive your printer, to the instructions accompanying that package.

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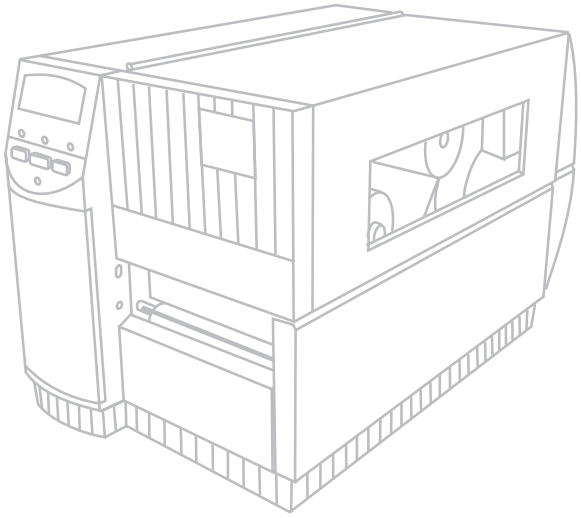
Color profile: Disabled
Composite Default screen



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Color profile: Disabled
Composite Default screen

Appendix A

Printer Configuration (Standard Front Panel)

NOTE: *To configure a Z Series™ printer having the optional deluxe front panel, refer to the information found later in this section.*

Serial Communications Parameters

Refer to Figure 25. When using serial communication, the Bank One (left) switches inside the front panel door must match the communication parameters of the printer with those of your host computer. When shipped from the factory, all switches are in the ON position. This presets the printer to match the typical PC environment - 9600 Baud, 8 Data Bits, No Parity, and Xon/Xoff Handshaking.

Figure 25. Standard Front Panel

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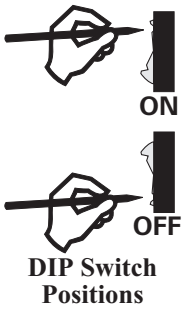
Color profile: Disabled
Composite Default screen

Refer to Table 8 if the settings need to be changed to match those of your host computer. If you do not know the settings of your host computer, refer to the instruction manual provided with the computer.

The serial port supports an Error Detection Protocol which sends and receives data in packets. **This "Zebra" protocol must be compatible with your host computer and your application software.** Received packets are checked for accuracy. If received correctly, the data in the packet is processed and an "acknowledge" packet is sent back to the host. If an error is found in the received packet, either a "negative acknowledge" packet or no response will be sent to the host. DO NOT enable Error Detection unless your host is programmed to use it. For additional information, refer to the *ZPL II Programming Guide*.

If the Bank One switches are in the proper position to match the communication configuration of the host computer, and the printer is not receiving data, see Appendix B to make sure you are using the correct interface cable.



DIP Switch Positions

BAUD RATE	SWITCH 1	SWITCH 2	SWITCH 3
9600	ON	ON	ON
19200	OFF	ON	ON
28800	ON	OFF	ON
38400	OFF	OFF	ON
600	ON	ON	OFF
1200	OFF	ON	OFF
2400	ON	OFF	OFF
4800	OFF	OFF	OFF

DATA BITS	SWITCH 4	NOTE: The printer requires one (1) stop bit minimum on received data and automatically supplies two (2) stop bits for transmitted data.
8 Data Bits	ON	
7 Data Bits	OFF	

HANDSHAKE	SWITCH 5
Xon/Xoff	ON
DTR/DSR	OFF

PARITY	SWITCH 6	SWITCH 7
Parity Disabled	ON	ON
Even	OFF	ON
Odd	ON	OFF
Parity Disabled	OFF	OFF

ERROR DETECTION	SWITCH 8	NOTE: Zebra Protocol is the default Error Detection Protocol enabled when "On - Switch 8 OFF" is selected.
Off	ON	
On	OFF	

Table 8. Bank 1 Switch Settings

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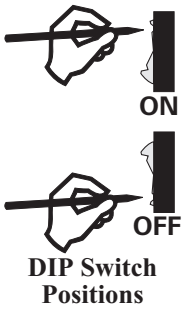
Color profile: Disabled
Composite Default screen

Operating Modes

Use the Bank Two (right) switches to select printer operating modes. When shipped from the factory, all switches are in the ON position. This presets the printer to match the most commonly used modes of operation - Tear-Off Mode, Non-continuous Media, Thermal Transfer Operation, and RS-232 Serial Communications.

If your printer is equipped with an option such as rewind, peel-off, or cutter, or if your application requires a different operating mode such as direct thermal, or continuous media, refer to Table 9 for the appropriate Bank Two switch settings.



DIP Switch Positions

DIP SWITCH/ZPL CONTROL		SWITCH 1
Dip Switches 2 - 6 Override ZPL		ON
ZPL Overrides Dip Switches 2 - 6		OFF
PRINT MODE	**SWITCH 2**	**SWITCH 3**
Tear-Off	ON	ON
Peel-Off	OFF	ON
Cutter	ON	OFF
Rewind	OFF	OFF
MEDIA TYPE	**SWITCH 4**	**SWITCH 5**
Non-Continuous Web Sensing	ON	ON
Non-Continuous Mark Sensing	ON	OFF
Continuous	OFF	OFF
PRINT METHOD	**SWITCH 6**	
Thermal Transfer	ON	
Direct Thermal	OFF	
SERIAL COM MODE	**SWITCH 7**	**SWITCH 8**
RS-232	ON	ON
RS-422/RS485 Single-Drop	OFF	ON
RS-485 Multi-Drop	OFF	OFF

Table 9. Bank 2 Switch Settings

NOTE: *The printer automatically senses if a parallel communications cable is connected from your host computer. The Bank One switches and Bank Two switches 7 and 8 have no effect on parallel communications.*

To see a printout of the printer configuration, perform the CANCEL Key Self Test. See the "Troubleshooting" section for more details.

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Color profile: Disabled
Composite Default screen

Standard Front Panel Control Keys

If you need to adjust the print darkness, label position or the image position on the label, use the following control keys located inside the front panel door to configure these parameters.

Print Darkness Key

Press this key (LED turns ON) to change the print darkness setting by pressing the PLUS (+) or MINUS (-) keys. Each press of the + or - key changes the setting by one step. *Press the Print Darkness key a second time to save the new setting.* The darkness setting limits are from zero (0) to 30.

Label Position Key

Press this key (LED turns ON) to change the label tear off/cut off position setting by pressing the (+) or (-) keys. Each press of the + or - key changes the setting by four dot rows. *Press the Label Position key a second time to save the new setting.* From the default value, the setting may be changed +120 or -120 dot rows.

Image Position Key

Press this key (LED turns ON) to change the image position setting by pressing the (+) or (-) keys. Each press of the + or - key changes the setting by four dot rows. *Press the Image Position key a second time to save the new setting.* From the default value, the setting may be changed +120 or -120 dot rows.

Plus Key (+)

When setting print darkness, each press of this key increases the darkness setting by 1.

When setting the label position, each press of this key moves the label tear off/cut off position four dot rows away from the end of the label just printed.

When setting the image position, each press of this key moves the image four dot rows away from the leading edge of the label being printed.

Minus Key (-)

Pressing this key has the opposite effect on the settings from the PLUS key.

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Printer Configuration (Deluxe Front Panel)

NOTE: *To configure a Z Series™ printer having the standard front panel, refer to the information found earlier in this section.*

Deluxe Front Panel Control Keys

Refer to Figure 26. Opening the door on the front panel provides access to the control keys used for configuring the printer's operating features. The Liquid Crystal Display (LCD) shows the menus as you proceed through the configuration process.

Figure 26. Deluxe Front Panel

The configuration sequence is a series of menus and prompts with programmable parameters for each menu listing.

START/SAVE Key

Press this key to enter the configuration mode. Once in the configuration mode, the first major menu selection (General Setup) is displayed.

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NEXT MENU Key

Press this key to increment through the major menu headings, showing the top level of each configuration section. When the end of the menu listing is reached, the list repeats automatically.

NEXT ITEM Key

Once the appropriate major menu is visible on the LCD display, the NEXT ITEM key can be used to sequence through the configuration prompts for that menu. When the end of the item listing is reached, the list repeats automatically.

When the appropriate item is displayed, the PLUS (+) and MINUS (-) keys can be used to select the setting for that item.

PLUS Key (+)

Press this key to increment the value of the item selected on the LCD.

MINUS Key (-)

Press this key to decrement the value of the item selected on the LCD.

NOTE: *When entering specific numeric values, use the MINUS key to select the digit position and the PLUS key to select the value for that position.*

Front Panel Programming

Table 10 provides the printer configuration parameters in the sequence in which they appear on the front panel LCD display. The DEFAULT value as well as the available choices for each parameter are given.

Once in the configuration mode, pressing the NEXT MENU key at any time will exit the current major menu feature list and move to the next major menu heading. An asterisk "*" appears in the upper left corner of the LCD if the value selected is different from the one currently saved.

NOTE: *Whenever a password is requested during the configuration process, the default value of "1234" may be entered . This password may be changed via a programming command sent to the printer from the host computer.*

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GENERAL SETUP MENU	
PARAMETER	**SELECTIONS**
LANGUAGE	Use the PLUS key or MINUS key to sequence through the LCD selections until the appropriate language is displayed. Default: English Choices: English, Spanish, French, German, Italian, Norwegian, Portuguese, Swedish, Danish, Spanish2, Dutch, Finnish or Custom.
DARKNESS	Set the darkness to the lowest setting possible for consistent high quality printing. To observe the effects of the newly entered value, go to the Print Listings parameter and print a setup label. Default: 10 Range: 0 to 30
TEAR OFF	This value sets the media rest position over the Tear/Peel Bar after printing or the cut-off point for cutter applications. Default: 00 Range: -120 to +120
PRINT MODE	Select a print mode that your hardware configuration supports, since some selections are for optional printer features. Default: Tear Off Choices: Tear Off, Rewind, Cutter, Peel Off
LABEL TOP	This value sets the print position vertically on the label. A more positive value moves the label top position farther down the label. A negative value moves the label top position up the label. Default: 00 Range: -120 to +120
LCD ADJUST	If the LCD is difficult to read, use the PLUS key or MINUS key to adjust the brightness of your display. Default: 10 Range: 00 to 19

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Table 10. Deluxe Front Panel Configuration

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Composite Default screen

COMMUNICATIONS	
PARAMETER	**SELECTIONS**
BAUD (password required)	Select the value that matches the one used by the host. Default: 9600 Choices: 600, 1200, 2400, 4800, 9600, 19200, 28800, or 38400
DATA BITS (password required)	Select the value that matches the one used by the host. (Must be set to 8 data bits to use Code Page 850.) Default: 8 bits/character Choices: 7 bits/character or 8 bits/character **NOTE**: The printer requires one (1) stop bit minimum on received data and automatically supplies two (2) stop bits for transmitted data.
PARITY (password required)	Select the value that matches the one used by the host. Default: None Choices: Even, Odd, None
HOST HANDSHAKE (password required)	Select the value that matches the one used by the host. Default: XON/XOFF Choices: XON/XOFF or DTR/DSR
PROTOCOL (password required)	Details on protocol can be found in the *ZPL II Programming Guide*, available from Zebra Technologies Corporation. Default: None Choices: None, Ack-Nak, Zebra **NOTE**: Zebra Protocol is the same as ACK/NAK except that with Zebra the response messages are sequenced. If Ack-Nak or Zebra is selected, then "DTR/DSR" Host Handshake must be selected.
SERIAL COMM (password required)	Select the choice that matches the one used by the host. Default: RS232 Choices: RS232, RS422/RS485, or RS485 Multidrop

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COMMUNICATIONS	
PARAMETER	**SELECTIONS**
NETWORK ID (password required)	The network ID is used to assign a unique number to a printer used in a network. This gives the host the means to address a specific printer. Default: 000 Choices: 000 to 999 **NOTE**: If the printer is used in a network, you **must** select a network ID number
COMMUNICATIONS (password required)	The communications diagnostics mode is a trouble-shooting tool for checking the interconnection between the printer and the host. When "Diagnostics" is selected, all data sent from the host to the printer will be printed as straight ASCII hex characters. All received characters, including control codes like CR (Carriage Return), are printed. Default: Normal Mode Choices: Normal Mode or Diagnostics Mode **NOTES**: An FE indicates a framing error. An OE indicates an overrun error. An PE indicates a parity error. An NE indicates noise. If errors are indicated, check that your communication parameters are correct.

PRINT LISTINGS	
PARAMETER	**SELECTIONS**
LIST FONTS	Press "+" to print a list of all standard and optional fonts currently available in the printer.
LIST BARCODES	Press "+" to print a list of all the barcodes currently available in the printer.
LIST IMAGES	Press "+" to print a list of all the images currently available in the printer.
LIST FORMATS	Press "+" to print a list of all the formats currently available in the printer.
LIST SETUP	Press "+" to print the printer's current configuration.
LIST ALL	Press "+" to print all of the previously indicated lists.

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Composite Default screen

MEDIA SETUP	
PARAMETER	**SELECTIONS**
MEDIA TYPE	Select the type of media you are using. Default: Non-Continuous Choices: Continuous or non-continuous **NOTE**: Selecting continuous media requires that you include a label length instruction in your label format (^LLxxxx - if you are using ZPL or ZPL II).
SENSOR TYPE	Select the type of media sensing you will use: - Web if a gap, space, notch, or hole is used to indicate the separations between labels. - Mark if a black mark printed on the back of the media is used to indicate the separations between labels. (If your media does not have black marks on the back, leave the printer at the default - Web.) Default: Web Choices: Web or Mark
PRINT METHOD	Select the method of printing you wish to use. - Direct thermal requires the use of heat sensitive label stock (no ribbon needed). - Thermal transfer uses many types of label stock along with an inked ribbon. Default: Thermal transfer Choices: Thermal Transfer or Direct Thermal **NOTE**: Selecting direct thermal when using thermal transfer media and ribbon creates a warning condition, but printing will continue.
PRINT WIDTH	Select a print width that is the closest to and at least as wide as your media. Setting the width too narrow may result in unprinted portions of your label format. Setting the width too wide wastes formatting memory and may cause printing off the right side of the label. Default: 104 mm (Z4000) 168 mm (Z6000) Choices: Up to 104 mm (Z4000) Up to 168 mm (Z6000) **NOTE**: Move the curser under “mm” using the MINUS key, use the PLUS key to change the reading from mm to inches or dots.

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CALIBRATION	
PARAMETER	**SELECTIONS**
MEDIA POWER UP (password required)	This parameter establishes the action of the media when the printer is turned ON. Default: Calibration Choices: Calibration - recalibrates media and ribbon sensors by feeding labels Feed - feeds the label to the first web Length - determines the length of the label by feeding labels No Motion - media does not move
HEAD CLOSE (password required)	This parameter establishes the action of the media after the printhead has been opened and then closed. Default: Calibration Choices: Calibration - recalibrates media and ribbon sensors by feeding labels Feed - feeds the label to the first web Length - determines the length of the label by feeding labels No Motion - media does not move
MANUAL CALIBRATE	If the auto-calibration feature has been disabled by a ZPL command from the host or the HEAD CLOSE parameter is not "Calibrate", you may use this feature to calibrate the media and ribbon sensors. Press "+" to enable the Calibration process. **NOTE**: If the printer is configured for continuous media, no media movement will occur during the Calibration process.
SENSOR PROFILE	The Media and Ribbon Sensor Profile provides a graphical representation of the Media and Ribbon Sensor settings as an aid to the Service Technician if problems with inter-label gap sensing occur. Press "+" to enable the Sensor Profile printout.
WEB S. MEDIA S. RIBBON S. MEDIA LED RIBBON LED	THESE SETTINGS SHOULD ONLY BE CHANGED BY AN AUTHORIZED SERVICE TECHNICIAN. (A password is required) Refer to the *Z Series Maintenance Manual* for additional information about these settings.

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ZPL CONTROL	
PARAMETER	**SELECTIONS**
CONTROL PREFIX (password required)	The printer looks for this 2-digit hex value to indicate the start of a ZPL/ZPL II Control instruction. Refer to the *ZPL II Programming Guide* for more information. Default: 7E (tilde - displayed as a black square) Choices: most hex values between 00 and FF (exclude the values indicated on the ASCII Code Chart in Appendix C)
FORMAT PREFIX (password required)	The printer looks for this 2-digit hex value to indicate the start of a ZPL/ZPL II Format instruction. Refer to the *ZPL II Programming Guide* for more information. Default: 5E (caret) Choices: most hex values between 00 and FF (exclude the values indicated on the ASCII Code Chart in Appendix C)
DELIMITER CHAR (password required)	The printer looks for this 2-digit hex value used as a parameter place marker in ZPL/ZPL II instruction. Refer to the *ZPL II Programming Guide* for more information. Default: 2C (comma) Choices: most hex values between 00 and FF (exclude the values indicated on the ASCII Code Chart in Appendix C)
ZPL MODE (password required)	The printer will remain in the selected mode until it is changed by this parameter or by sending a ZPL/ZPL II command. The printer accepts label formats written in either ZPL or ZPL II. This eliminates the need to rewrite any ZPL formats you already have. Refer to the *ZPL II Programming Guide* for more information. Default: ZPL II Choices: ZPL II or ZPL

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ADVANCED SETUP	
PARAMETER	**SELECTIONS**
BACKFEED (password required)	In the Cutter mode, this parameter establishes when and how much label backfeed occurs after a label is cut. It has no effect in the Tear-Off, Peel, or Rewind modes. This parameter can be superseded by the ~JS instruction when received as part of a label format. (Refer to the *ZPL Programming Guide*.) Default: Default (default is defined as 90%) Choices: Default, After, Off, Before, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80% **NOTE**: The difference between the value entered and 100% establishes how much backfeed occurs before the next label is printed. For example, a value of 40 means that 40% of the backfeed takes place after the label is cut. The remaining 60% takes place before the next label prints. A value of "before" means that all backfeed will take place before the next label is printed.
LEFT POSITION	This parameter establishes how far from the left edge of a label the format will begin to print by adjusting the horizontal positioning on the label. Positive numbers adjust the printing to the left by the number of dots selected. Negative numbers shift printing to the right. Default: 000 Choices: -9999 to +9999 **NOTE**: For a negative value, enter the value before entering the minus sign.
INITIALIZE CARD (password required)	This parameter allows you to initialize (erase) the PCMCIA Card installed in the optional PCMCIA Port. Press + to initialize. Then, if not sure, press – for NO, or if you are sure, press + for YES.
INIT FLASH MEM (password required)	This parameter allows you to initialize (erase) the optional non-volatile memory installed in the printer. Press + to initialize. Then, if not sure, press – for NO, or if you are sure, press + for YES.

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Exiting the Configuration mode

When you are finished changing or reviewing the necessary parameters, press the START/SAVE key. Use the NEXT ITEM key to select one of the "SAVE" choices shown below; then press the START/SAVE key again to end the configuration process.

- PERMANENT - new settings overwrite previous values in configuration memory.
- TEMPORARY - printer operates with new settings until power is turned off; when power is turned back on, the printer reverts back to the PERMANENT values.
- CANCEL - printer makes no changes and returns to the current settings.
- LOAD DEFAULTS - all values return to the factory settings.
- LOAD LAST SAVE - printer operates with last set of values saved (either permanent or temporary).

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Appendix B

Communication Interfaces

Data cables must be fully shielded and fitted with metal or metalized connector shells to prevent radiation and reception of electrical noise. To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible.
- Do not bundle the data cables tightly with power cords.
- Do not tie the data cables to power line conduits.

Serial Data Communications

Table 11 illustrates the pin connections on the DB-25 connector at the rear of the printer.

PIN NO.	DESCRIPTION
1	Chassis Ground
2	TXD (Transmit Data) output from the printer
3	RXD (Receive Data) input to the printer
4	RTS (Request To Send) output from the printer
5	Not Used
6	DSR (Data Set Ready) input to the printer
7	RS-232 Signal Ground
8	Not Used
9	+5V @ 1A source
10	Not Used
11	RS-485 Signal Ground
12	Not Used
13	RS-485 Input B (-)
14	RS-485 Output B (-)
15	Not Used
16	RS-485 Input A (+)
17-18	Not Used
19	RS-485 Output A (+)
20	DTR (Data Terminal Ready) output from the printer
21-25	Not Used

Table 11. Rear Panel Serial Data Port Pinout

RS-232 Interface

The *Z* Series™ printer is configured as Data Terminal Equipment (DTE). The serial data cable used to connect the printer to the host computer will be one of two styles:

- **9-pin to 25-pin cable** - (NULL Modem Cable) must have a 9-pin "D" Type (DB9S) connector on the end that is plugged into the serial port at the computer and a 25-pin "D" Type (DB25P) connector on the other end that is plugged into the connector at the rear of the printer. Figure 27 shows the required cable connections.

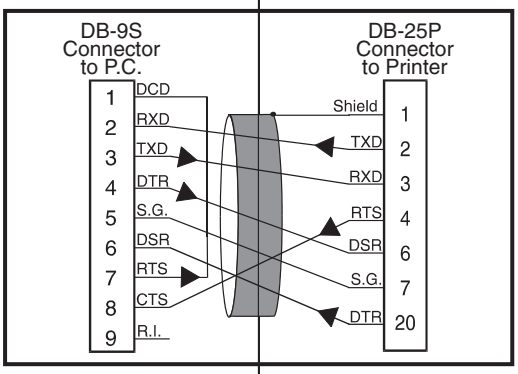

Figure 27. 9-Pin to 25-Pin Cable

- **25-pin to 25-pin cable** - (NULL Modem Cable) must have a 25-pin "D" Type (DB25S) connector on the end that is plugged into the serial port at the computer and a 25-pin "D" Type (DB25P) connector on the other end that is plugged into the connector at the rear of the printer. Figure 28 shows the required cable connections.

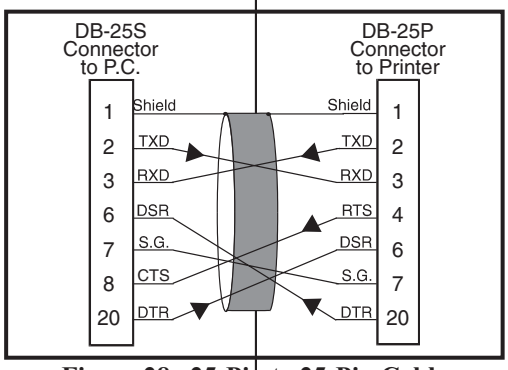

Figure 28. 25-Pin to 25-Pin Cable

Hardware Control Signal Descriptions

For all RS-232 input and output signals, the Z Series™ printer follows both the Electronics Industries Association (EIA) RS-232 and the Consultative Committee for International Telegraph and Telephone (CCITT) V.24 standard signal level specifications.

When DTR/DSR handshaking is selected, the Data Terminal Ready (DTR) control signal output from the printer controls when the host computer may send data. DTR ACTIVE (positive voltage), permits the host to send data. When the printer places DTR in the INACTIVE (negative voltage) state, the host must not send data.

NOTE: *When Xon/Xoff handshaking is selected, data flow is controlled by the ASCII Control Codes DC1 (XON) and DC3 (XOFF). The DTR Control lead will have no effect.*

Request To Send (RTS) is a control signal from the printer which is connected to the Clear To Send (CTS) input at the host computer. RTS is always ACTIVE (positive voltage) when the printer is ON.

CAUTION: The Z Series™ printers comply with FCC "Rules and Regulations", Part 15 for Class B Equipment, using fully shielded six-foot data cables. Use of longer cables or unshielded cables may increase radiated emissions above the Class B limits.

RS-485 Interface

Figure 29 illustrates the pin connections on the DB-25 connector at the rear of the printer which are used for the RS-485 communication protocol.

NOTE: *Xon/Xoff handshaking must be used for RS-485 communications.*

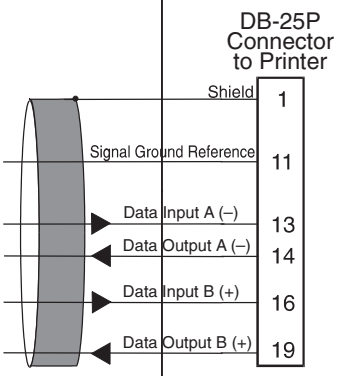

Figure 29. RS-485 Cable

Parallel Data Communications

Table 12 illustrates the pin connections on the Bi-directional Parallel connector at the rear of the printer.

Parallel Interface

The 8-Bit Parallel Data Interface supports IEEE 1284 bi-directional parallel communications in “nibble mode”. The parallel interface provides a means of communication which is typically faster than the previously mentioned serial interface methods. In this method, the bits of data which make up a character are sent all at one time over several wires in the cable, one bit per wire.

Parallel Cabling Requirements

An IEEE 1284 compatable bi-directional parallel data cable is required when this communication method is used. The required cable must have a standard 36-pin parallel connector on one end which is plugged into the mating connector located at the rear of the printer. The other end of the cable connects to the printer connector at the host computer.

PIN NO.	PARALLEL CONNECTOR PINOUT
1	nStrobe/Host Clk
2 - 9	Data Bits 1-8
10	nAck/PtrClk
11	Busy/Per Busy
12	PError/Ack Data Req.
13	Select/Xflag
14	nAuto Fd/Host Busy
15	Not Used
16-17	Ground
18	+5V @ 1A
19 - 30	Ground
31	nInit
32	nFault/nData Avail.
33-34	Not Used
35	+5V thru 3.3KΩ Resistor
36	nSelectIn/1284 active

Table 12. Rear Panel Parallel Data Connector Pinout

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Composite Default screen

Appendix C

AC Power Cord

Since many areas of the world have specific power requirements, an AC Power Cord may not be included with your printer. Refer to Figure 30. A power cord must be provided by you that meets your local electrical requirements.

WARNING!! For personnel and equipment safety, always use a three-prong plug with an earth ground connection to the AC Power Source.

AC Power Cord Specifications

- The overall length must be less than 9.8ft. (3.0 meters)
- It must be rated for at least 5A, 250V.
- The chassis ground (earth) MUST be connected to assure safety and reduce electromagnetic interference. The ground connection is handled by the third wire (earth) in the power cord.
- The AC power plug and IEC320 connector must bear the certification mark of at least one of the known international safety organizations shown in Figure 30.

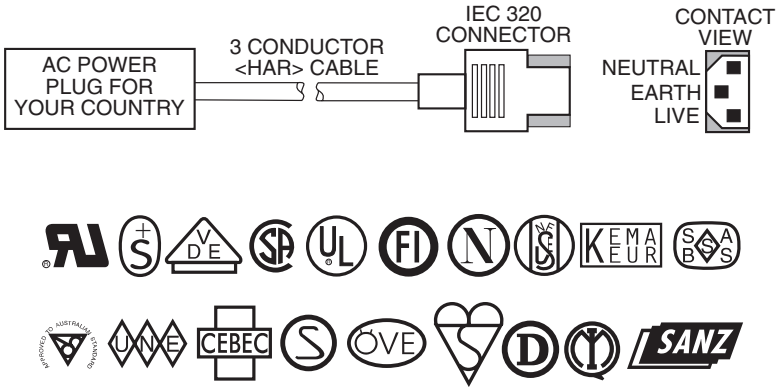

Figure 30. AC Power Cord Requirements

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Fuse Replacement

A user-replaceable AC Power Fuse is located just below the AC Power Switch at the rear of the printer. The replacement fuse is a 3AG Fast Blow style rated at 5 Amp/250 VAC

Before replacing the fuse, turn the AC Power Switch OFF and unplug the AC Power Cable.

To replace the fuse, insert the tip of a flatblade screwdriver into the slot in the end of the Fuse Holder End Cap. Press in slightly on the End Cap and turn the screwdriver slightly counterclockwise. This will disengage the End Cap from the Fuse Holder and permit removal of the fuse.

To install a new fuse, reverse the sequence.

Shipping

To ship the *Z* Series™ printer, remove all ribbon and media from the supply and take-up spindles to prevent damage to the printer. Carefully pack the printer in a suitable container to avoid damage during transit. Whenever possible, use the original "carton within a carton" packing materials from the factory. A shipping container can be purchased from Zebra Technologies Corporation if the original packaging is lost or destroyed.

If you use a different container, package the printer carefully to avoid damage.

CAUTION: When packaging the printer in a rigid container, use shock mounts or shock-absorbing packing material.

Setting Darkness For "In-Spec" Bar Codes

All Direct Thermal and Thermal Transfer materials do not have the same Darkness requirements. The best way to check for the proper darkness setting is to use a Bar Code Verifier that actually measures bars/spaces and will calculate the PCS ratio. Without the assistance of a verifier, your eyes and/or the scanner to be used in the system, are the best bet for picking the optimum darkness setting. The following is a simple yet effective method for adjusting the darkness setting to print "In Spec" bar codes. Refer to Figure 31 for sample bar codes.

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Composite Default screen

1. Load media (and Ribbon if required) according to the appropriate Media Loading and Ribbon Loading Instructions found in this User's Guide. Insure the Print Method is appropriately characterized for either Direct Thermal or Thermal Transfer.
2. To print a label for evaluation, use the following procedure:
   A. With Power OFF, press and hold the FEED Key.
   B. Turn the Printer Power ON, then release the FEED Key.
   C. The Printer will power up and begin printing test labels.
3. Print a label, then press the PAUSE Key. The label will contain two bar codes as well as other printer information. Normal bar codes are printed in a horizontal format as they feed out of the printer. Rotated bar codes are printed in a vertical format.
4. Compare the test label printed, to the bar codes in Figure 31. If the test label appears too light or too dark, refer to Appendix A and increase or decrease the DARKNESS Setting accordingly.
5. Resume printing by pressing the PAUSE Key again. Print a few labels at the new setting and verify that proper "In Spec" bar codes are being printed. Repeat steps 3, 4 and 5 until satisfied.
6. To terminate the printing of the test labels, press the PAUSE Key, then epress the CANCEL Key.

Printing Conditions

Too Dark - Dark labels are fairly obvious. The normal bar code bars increase in size, and the openings in small alphanumeric characters may fill in with ink. It may be readable but not "In Spec". Rotated bar code bars and spaces will run together.

Slightly Dark - Slightly dark labels are not as obvious. The normal bar code will be "In Spec". Small character alphanumerics will be bold and could be slightly filled in.The rotated bar code spaces are small when compared to the "In Spec" code, possibly making the code unreadable.

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Composite Default screen

Slightly Light - Slightly light labels are, in some cases, preferred to slightly dark for “In Spec” bar codes. Both normal and rotated bar codes will be “In Spec”, but small alphanumeric characters may not be complete.

Too Light - Light labels are very obvious. Both normal and rotated bar codes have incomplete bars and spaces. Small alphanumeric characters are unreadable.

In Spec - The “In Spec” bar code can only be confirmed by a verifier, but it should exhibit some very visible characteristics. The normal bar code will have complete, even bars and clear, distinct spaces. The rotated bar code will also have complete bars and clear distinct spaces. Although it may not look as good as a slightly dark bar code, it will be “In Spec”. In both normal and rotated styles, small alphanumeric characters will look complete.

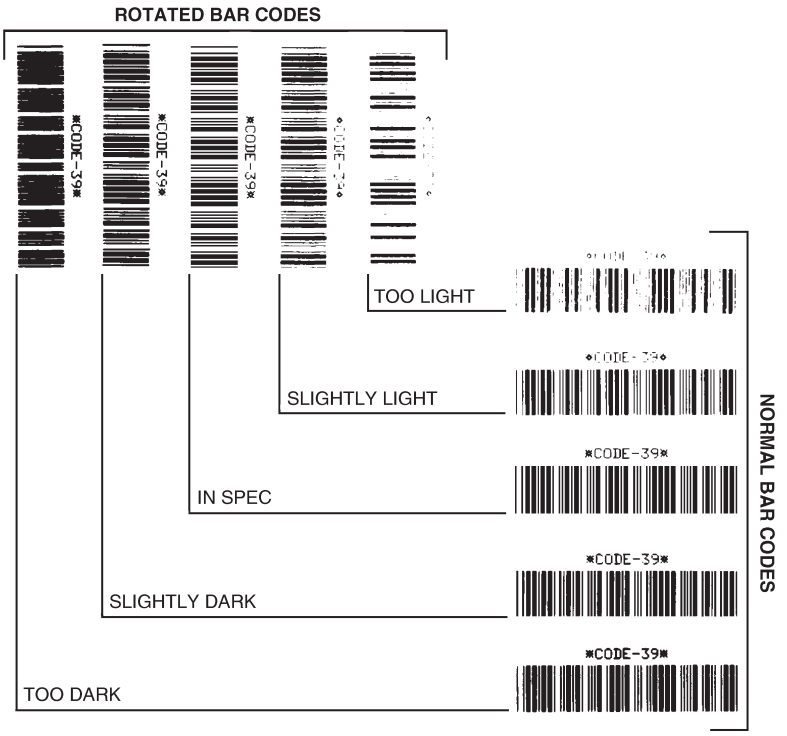

Figure 31. Bar Code Examples

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ASCII Code Chart

American Standard Code for Information Interchange

HEX	CHAR	HEX	CHAR	HEX	CHAR	HEX	CHAR
00	NUL	20	space	40	@	60	‘
01	SOH	21	!	41	A	61	a
02	STX	22	“	42	B	62	b
03	ETX	23	#	43	C	63	c
04	EOT	24	$	44	D	64	d
05	ENQ	25	%	45	E	65	e
06	ACK	26	&	46	F	66	f
07	BEL	27	‘	47	G	67	g
08	BS	28	(	48	H	68	h
09	HT	29	)	49	I	69	i
0A	LF	2A	*	4A	J	6A	j
0B	VT	2B	+	4B	K	6B	k
0C	FF	2C	,	4C	L	6C	l
0D	CR	2D	-	4D	M	6D	m
0E	SO	2E	.	4E	N	6E	n
0F	SI	2F	/	4F	O	6F	o
10	DLE	30	0	50	P	70	p
11	DC1	31	1	51	Q	71	q
12	DC2	32	2	52	R	72	r
13	DC3	33	3	53	S	73	s
14	DC4	34	4	54	T	74	t
15	NAK	35	5	55	U	75	u
16	SYN	36	6	56	V	76	v
17	ETB	37	7	57	W	77	w
18	CAN	38	8	58	X	78	x
19	EM	39	9	59	Y	79	y
1A	SUB	3A	:	5A	Z	7A	z
1B	ESC	3B	;	5B	[	7B	{
1C	FS	3C	<	5C	\	7C	|
1D	GS	3D	=	5D	]	7D	}
1E	RS	3E	>	5E	^	7E	~
1F	US	3F	?	5F	_	7F	DEL

NOTE: NOT recommended for use as a Command Prefix, Format Prefix, or Delimiter Character

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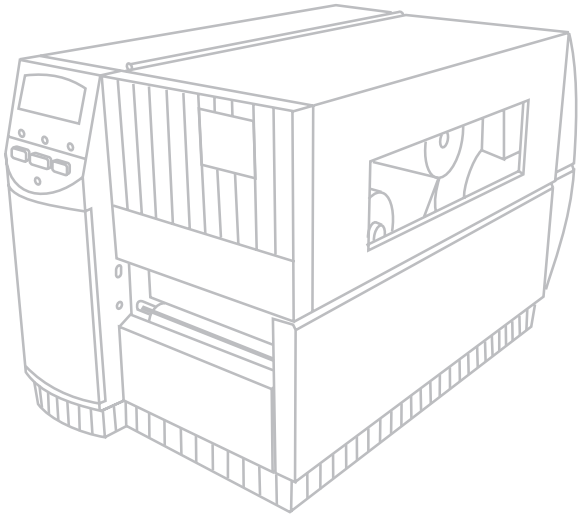

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Glossary

alphanumeric Indicating letters, numerals, and characters such as punctuation marks.

backfeed When the printer pulls the media and ribbon (if used) backward into the printer so that the beginning of the label to be printed is properly positioned behind the printhead. Backfeed occurs when operating the printer in tear-off, peel-off, or cutter mode.

bar code A code by which alphanumeric characters can be represented by a series of adjacent stripes of different widths. Many different code schemes exist, such as the universal product code (UPC) or Code 39.

calibration (of a printer) A process in which the printer determines some basic information needed to print accurately with a particular media and ribbon combination. To do this, the printer feeds some media and ribbon (if used) through the printer and senses whether to use the direct thermal or thermal transfer print method,and (if using non-continuous media) the length of individual labels or tags.

character set The set of all letters, numerals, punctuation marks, and other characters that can be expressed by a particular font or barcode.

check digit A character added to a barcode symbol that indicates to the scanner that it has read the symbol correctly.

continuous media Label or tagstock media that has no notch, gap, or web (backing material only) to separate the labels or tags - the media is one long piece of material.

core diameter The inside diameter of the cardboard core at the center of a roll of media or ribbon.

cutter A device that can cut the media into individual labels or tags immediately after it is printed.

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diagnostics Information about which printer functions are not working - used for troubleshooting printer problems.

die-cut labels See non-continuous media.

direct thermal A printing method in which the printhead presses directly against the media. Heating the printhead elements causes a discoloration of the heat-sensitive coating on the media. By selectively heating the printhead elements as the media moves past, an image is printed onto the media. No ribbon is used with this printing method. Contrast this with *thermal transfer*.

direct thermal media Media that is coated with a substance which reacts to the application of direct heat from the printhead to produce an image.

fanfold media Media that comes folded in a rectangular stack. Contrast this with *roll media*.

font A complete set of alphanumeric characters in one style of type. Ex: CG Times™, CG Triumvirate Bold Condensed™.

ips "inches-per-second" The speed at which the label or tag is printed. Zebra offers printers that can print from 2 ips to 12 ips.

label An adhesive-backed piece of paper, plastic, or other material on which information is printed.

label available sensor For printers equipped with the Peel-Off Option, this sensor detects a printed label waiting to be taken or "picked" by the operator. While it detects this label, the printer will not print additional labels. Once the label has been removed from the printer,the next label is printed. Also called the "take-label sensor".

label backing (label liner) The material on which labels are affixed during manufacture and which is discarded or recycled by the end-users.

media Material onto which data is printed by the printer. Types of media include: tagstock, die-cut labels, continuous (with and without backing material), fanfold, and roll.

media sensor This sensor is located behind the printhead to detect the presence of media and, for non-continuous media, the position of the web, hole, or notch used to indicate the start of each label.

media supply hanger The stationary arm that supports the media roll.

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non-continuous media Consumable printing stock which contains an indication of where one label/printed format ends and the next one begins. Examples are die-cut labels, notched tagstock, and stock with black mark registration marks

non-volatile memory Electronic memory that retains data even when the power to the printer is turned OFF.

print speed The speed at which printing occurs. For thermal transfer printers, this speed is expressed in terms of ips (inches per second). Zebra offers printers that can print from 2 ips to 12 ips.

printhead wear The degradation of the surface of the printhead and/or the print elements over time. Heat and abrasion can cause printhead wear. Therefore, to maximize the life of the printhead, use the lowest print darkness setting (sometimes called burn temperature or head temperature) and the lowest printhead pressure necessary to produce good print quality. In the thermal transfer printing method, use ribbon that is as wide or wider than the media, to protect the printhead from the rough media surface.

registration Alignment of printing with respect to the top of a label or tag.

ribbon A band of material consisting of a base film coated with wax or resin "ink". The inked side of the material is pressed by the printhead against the media. The ribbon transfers ink onto the media when heated by the small elements within the printhead. Zebra ribbons have a coating on the back that protects the printhead from wear.

ribbon wrinkle A wrinkling of the ribbon caused by improper alignment or improper printhead pressure. This wrinkle can cause voids in the print and/or the used ribbon to rewind unevenly. This condition should be corrected by performing adjustment procedures.

roll media Media that comes supplied rolled onto a core (usually cardboard). Contrast this with *fanfold media*.

supplies A general term for media and ribbon.

tag A type of media having no adhesive backing but featuring a hole or notch by which the tag can be hung on something. Tags are usually made of cardboard or other durable material.

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take label sensor See *label available sensor*.

thermal direct See *direct thermal*.

thermal transfer A printing method in which the printhead presses an ink or resin coated ribbon against the media. Heating the printhead elements causes the ink or resin to transfer onto the media. By selectively heating the printhead elements as the media and ribbon move past, an image is printed onto the media. Contrast this with *direct thermal*.

void A space where printing should have occurred, but did not due to an error condition such as wrinkled ribbon or faulty print elements. A void can cause a printed bar code symbol to be read incorrectly or not at all.

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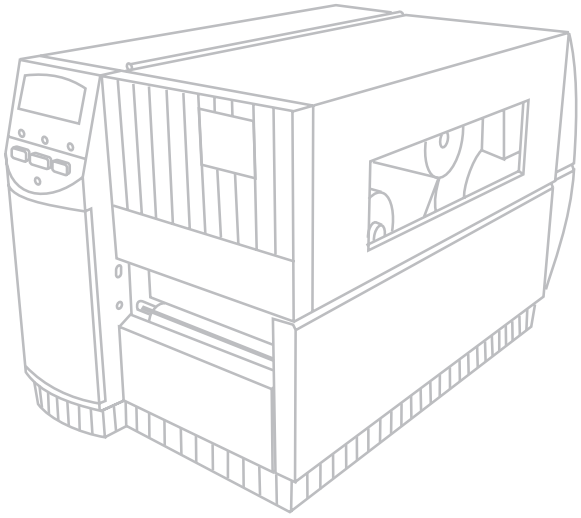

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